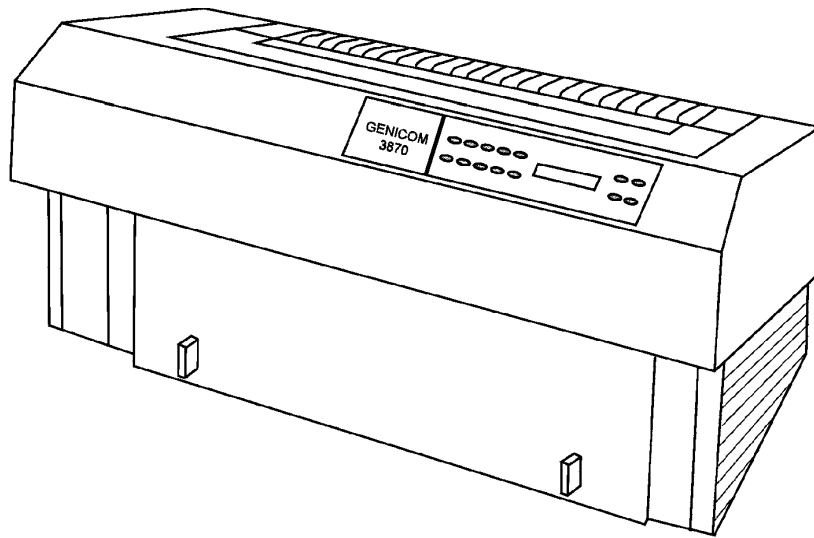




**Model 3870
User's Manual
GEK-89384B**

FCC Compliance Statement

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e. in strict accordance with the instructions, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

Instructions to User

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- Ensure that cover mounting screws, attachment connector screws, and ground wires are tightly secured.
- Ensure that the data cable shield is properly grounded at the printer and data source connectors. If necessary, consult your dealer service representative for additional suggestions.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interferences.

The user may find the following booklet prepared by the Federal Communications Commission helpful: How to Identify and Resolve Radio-TV Interference Problems.

The above booklet is available from the US. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

SICHERHEITS – ANLEITUNG

Modelle GENICOM 3870 DA

Das Gerät entspricht der Schutzklasse I und muß immer an eine 3-adrige, geerdete Steckdose angeschlossen werden. Der Netzan-schluß befindet sich an der Druckerrückwand. Stellen Sie sicher, daß die Netzspannung mit den Angaben auf dem Typenschild übereinstimmt.

Einschalten des Druckers :

- Alle Abdeckungen müssen geschlossen sein
- Keine Gegenstände auf dem Drucker ablegen oder gegen das Gerät lehnen
- Schalten Sie am Netzschalter den Drucker ein (1). Die "Power-Anzeige" leuchtet auf und zeigt damit an, daß der Drucker eingeschaltet ist.

Abschalten:

- Um den Drucker abzuschalten, Schalten Sie am Netzschalter den Drucker aus (0).

A C H T U N G

Arbeiten und Reparaturen am geöffneten Gerät dürfen nur vom autorisierten GENICOM – Kundendienst vorgenommen werden.

Bescheinigung des Herstellers/Importeurs

Heirmit wird bescheinigt, daß der / die

3870 DA (Gerät, Typ. Bezeichnung)

In Übereinstimmung mit Bestimmungen der

vfg 1046/1984 (Amtsblattverfügung)

funkentstört ist/ sind.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die

Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

GENICOM GmbH, Auf der Krautweide 32

65812 Bad Soden/ Taunus

Tel. 0049619665990 Fax 00496196659990

Name des Herstellers / Importeurs

Statement of Compliance

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n' émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

External Devices

Connecting any external device to this printer may affect its electrostatic discharge (ESD) performance, or its radio frequency interference (RFI) performance, or both.

Trademark Acknowledgments

All trademarks and registered trademarks are property of their respective holders.

CENTRONICS of GENICOM Corporation.

Epson of Epson America, Incorporated

DEC of Digital Equipment Corporation

GENICOM of GENICOM Corporation

IBM and Proprinter of International Business Machines Corporation

Patent Information

The design of this equipment is protected by one or more of the following US. patents and their international equivalents: 4,761, 087; 4,743, 133; 5,066, 153; 4,630, 948; 4,468, 140; 4,213, 714; 4,213, 716; 4,368, 993; 4,627, 344; D-294, 038; 4,988, 224; 4,806, 036; 4,479, 598; 4,706,561; 4,162, 131; 4,333, 398; 4,568, 209; D-272, 741; D-295, 186; 5,037, 222; 4,482, 148; 5,051, 010; 4,487, 515; 5,074, 837; 4,210, 404; 4,322, 172; 4,632,582; D-282; D-282, 173; D-315, 169

Code Compliance

Codes and standards the printer conforms to are listed below :

- UL Standard 1950, 3rd Edition
- C-UL C22.2 No. 220
- GS Sign (Safety), international model only)
- FCC Rules, Part 15, Subpart B
- ANSI X3.4-1977 (code set)
- ANSI X3.41-1974 (code extension)
- ANSI X3.64-1979 (additional codes)
- EIA 232C / CCITT V.24 (personality board dependent)
- IEC 950 (EN60950 / 9.88)
- ISO DP 7779-3 / 9 / 82 and ANSI 12.10-1985 (acoustics)
- EN 50082-1 European Immunity
- EN 55022 CISPR-B Radio Frequency Interference
- International units comply with CE Marking directives

Interface Connectors

CAUTION

Interface connectors may exceed class 2 or LPS limits. Appropriate interconnecting cabling in accordance with the NEC shall be used during installation.

Table of contents

Page

Chapter 1. Introduction	1-2
Chapter 2. Set It Up and Get It Running	2-1
Choose a Place for the Printer that is :	2-1
Select the Voltage (Models with Voltage Selector Switch)	2-2
Select the Voltage (Models without Voltage Selector Switch)	2-2
Power Cords.....	2-3
Plug It In and Turn It On	2-4
Install the Ribbon.....	2-5
Removing the Ribbon	2-10
Put Paper in the Tractors	2-11
Load a Form	2-14
Print a Test Pattern	2-15
A Note About Print Head Gap Adjustment	2-17
Adjust Top-of-Form	2-17
Attach to a Data Source	2-18
Quick Status	2-19
Line Registration on the first form.....	2-20
Chapter 3. Control Panel	3-1
Control Panel Keys.....	3-1
LCD Menu Map	3-5
Select the Emulation	3-7
Status Sheet.....	3-9
Chapter 4. Printed Menu	4-1
The > Arrow Means the Option Is Enabled.....	4-1
Sometimes Values Are Entered	4-2
Access the Printed Menu	4-2
Margins for Menu Listings	4-3
FORMER and FIRST	4-3
Printed Menu Map	4-3
Exit the Printed Menu	4-12
Chapter 5. Control Panel Lockouts	5-1
Lock the Printer Online	5-1
Lock the Printed Menu	5-3
Lock Various Keys.....	5-3
Chapter 6. Formats	6-1
What Is A Format ?	6-1
Why Use Formats?.....	6-1
The Active Format	6-2
Stored Formats.....	6-2
Print All Format Information.....	6-2
Formats Auto-execute on Paper Path Change.....	6-3

Table of contents

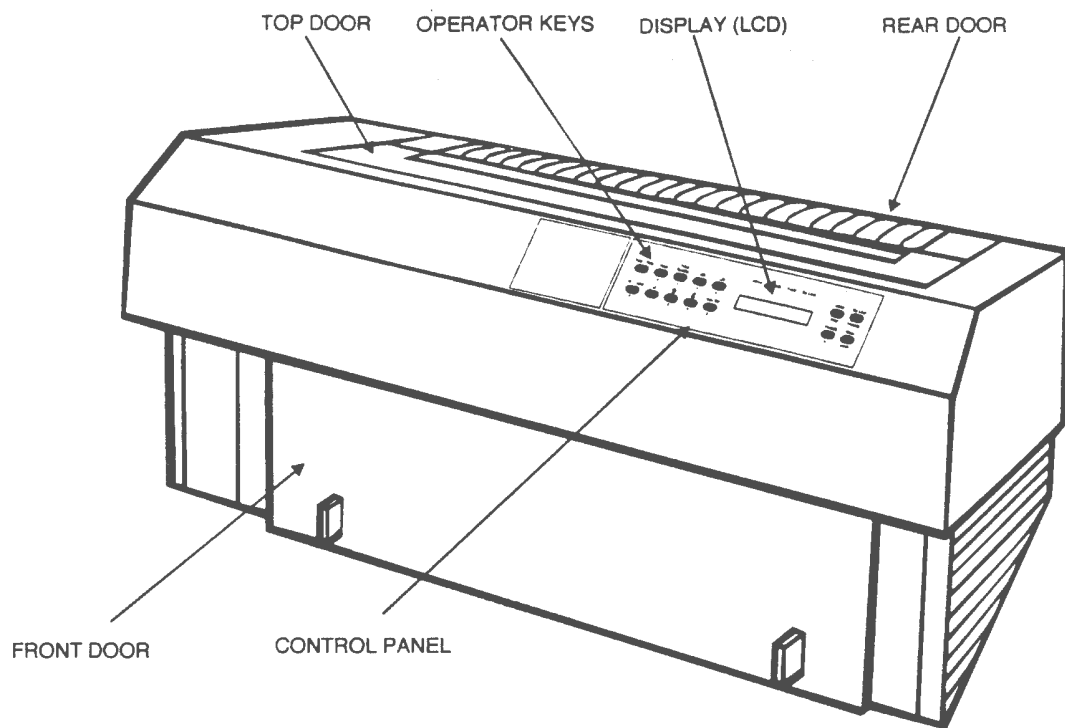
Page

Chapter 6. Formats (Continued)	
Change a Format - Printed Menu	6-3
Save a Format from the Control Panel	6-4
Save a Format from the Host	6-4
Select a Format from the Control Panel	6-4
Select a Format from the Host.....	6-4
Select the Assigned Format from the Host.....	6-5
Power Up to the Currently Assigned Format	6-5
Rename a Format	6-5
LCD Message Display	6-5
Linking Emulations to Formats	6-6
Chapter 7. LCD Head Gap Menu	7-1
Change Ribbon	7-2
Pros and Cons of Auto Head Gap Adjust	7-2
Semiautomatic Head Gap Adjust	7-5
Chapter 8. Line Up the Job on the Page	8-1
Vertical Paper Movement	8-1
What is a Print Reference?.....	8-2
Set a Top Print Reference	8-2
Set the Tear Off Distance	8-3
Set a Left Print Reference	8-3
Local Margins are Tricky	8-4
Use Top Print Reference or Top Margin?.....	8-4
Use Left Print Reference or Left Margin?	8-5
Load Length Adjustment	8-5
Chapter 9. Power Up and Reset	9-1
The State of the Printer on Power-up	9-1
Reset the Printer - ISU	9-1
After a Software Upgrade	9-2
After an ISU	9-2
Chapter 10. Paper Handling Features and Techniques	10-1
Adjust Paper Tension	10-2
Install the Front Tractors.....	10-4
Switch Between Front Feed and Bottom Feed	10-6
Removing the Rear Tractors	10-7
Change Paper Paths from the Control Panel	10-9
Change Paper Paths from the Host.....	10-10
Recover from a Remote Path Change Failure.....	10-10
Auto Load on Paper Out.....	10-11
Multipart Forms	10-11
Manual Paper Path.....	10-12

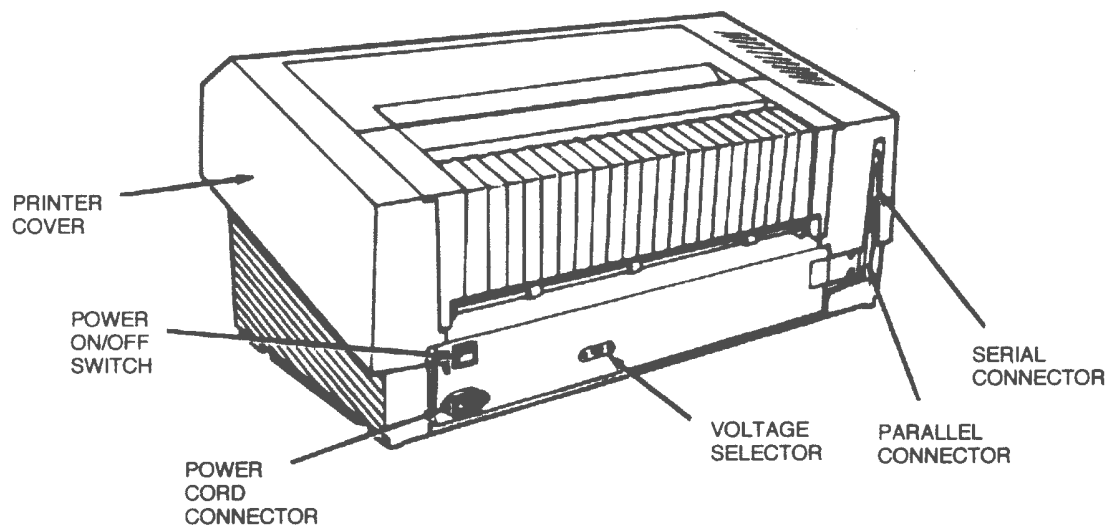
Table of contents

Page

Chapter 10. Paper Handling Features and Techniques (Continued)	
Manual Path Auto-loads the Next Sheet	10-14
Continuous Envelopes	10-15
Clean Up After Nonbonded Paper	10-15
Tips for Continuous Forms	10-16
Chapter 11. Maintenance and Troubleshooting	11-1
Clean the Printer	11-1
Troubleshooting.....	11-3
Hex Dump	11-5
Serial Interface Loopback Test.....	11-6
Replacing the Print Head	11-6
Adjust the Flight-Time Compensation	11-9
Chapter 12. Interface	12-1
RS-232C Serial Interface	12-1
Serial Data Cable	12-4
Serial Pin Assignments.....	12-4
CENTRONICS Parallel Interface.....	12-5
Parallel Interface Signals.....	12-5
Parallel Timing Diagram	12-6
Parallel Data Cable	12-7
Buffer Options	12-8
Appendix A. Emulation and Software Options	A-1
Emulation Options	A-2
Software Options.....	A-4
Appendix B. Hardware Configuration Menu.....	B-1
Appendix C. Options and Supplies	C-1
Appendix D. Specifications	D-1
Paper Handling.....	D-2
Printer Emulations	D-2
Print Technology	D-3
Form Control	D-4
Complete Index.....	Index-1



Front View



Rear View

Chapter 1. Introduction

This printer is a high duty cycle, serial dot matrix printer with a dual paper path and auto print head gap adjustment.

- Among the advanced features of this printer are: automatic or semiautomatic print head gap adjustment, remote or local selection of emulations, remote or local selection of paper paths, automatic loading of a second paper path when the first path is empty, and the ability to store, for subsequent recall, four user-defined sets of parameters called formats. Other characteristics are :
 - input voltage: switch-selectable 115 or 230 VAC
 - power dissipation: 130 watts maximum
 - hardware interfaces: menu selectable CENTRONICS parallel and RS-232 serial; and, by adapters: 10 Base T, Token
 - standard emulations: menu-or host-selectable ANSI X3.64, IBMGP, IBM Proprinter XL, DEC LA-210, Epson FX 286e, and GENICOM 3410.
 - standard fonts: menu-or host-selectable Gothic, Gothic Italic, Micro Gothic, Wide Gothic, Courier, and Courier Italic, OCR-A, OCR-B, Oversize in Draft or Near Letter quality, each; in pitches of 10, 12, 13, 15, 16, 17, 17.1, 20.
- ANSI Oversized: rotatable, expandable to 18700 points in 10-point increments. See Oversized Font chapter in *Programmer's Manual*.
- ANSI bar codes: Twenty-four styles, rotatable and scaleable. See Bar Code chapter in *Programmer's Manual*.

NOTE: Complete specifications are in Appendix D.

Chapter 2. Set It Up and Get It Running

Packaged with the printer and this manual are a power cord, a ribbon cartridge, a tractor assembly, and a programmer's manual.

Choose a Place for the Printer that is :

<i>level and solid</i>	Print head speeds are very high. If the printer table is not extremely stable, the printer may cause the printer table to rock.
<i>away from direct sunlight</i>	Ribbon inks dry out in the sun.
<i>away from heaters and heating vents</i>	High temperatures degrade plastic and stress electrical components, and provokes thermal throttle.
<i>away from excessive dust or moisture</i>	Dust shortens print head and gear train life. Very high humidity causes paper handling problems.
<i>within 6.5 feet of a grounded AC outlet</i>	The length of the power cord.
<i>suitable for using the bottom paper path ...</i>	The printer stand must have a slot through which to feed paper. A suitable pedestal is available from an authorized dealer. See "Paper Handling Features and Techniques", Chapter 10. The bottom paper path is the best choice for gummed labels, bar codes, multipart forms, and other hard-to-feed stock.
<i>away from conference rooms & their door-ways</i>	Sound emission at 10 ft can be high even with all damping plastic in place and printer operating with top and/or front doors open or cover panels removed. Noise is a workplace stress factor.
<i>away from critically dust-sensitive operations</i>	All paper is a source for dust. Printhead wires create more of this dust. Higher printer use with economy papers can create high enough dust levels to aggravate asthma or contaminate sensitive processes. Never put any printer in a "clean room".

Select the Voltage (Models with Voltage Selector Switch)

CAUTION: Do not select 115V and plug the printer into 230V !

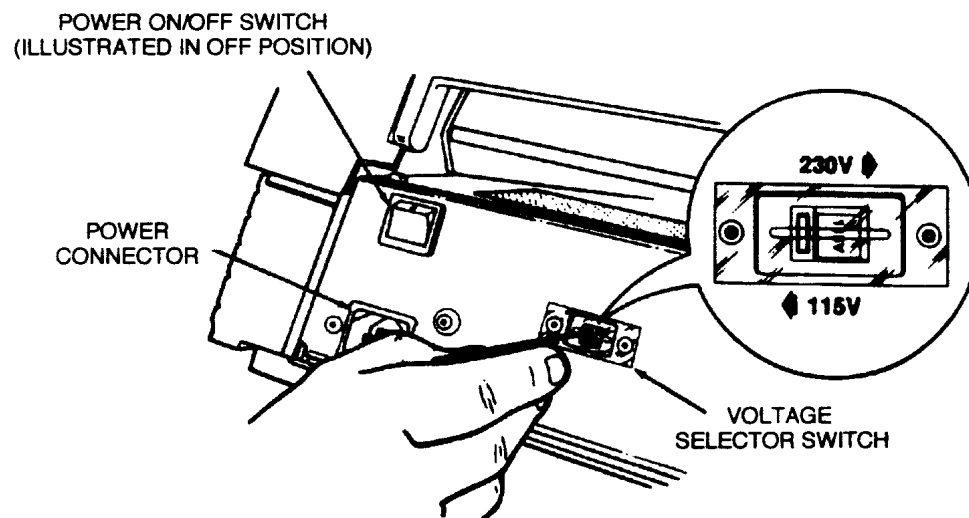
Check the voltage selector switch on the back of the printer.

If you need to change voltage ...

If the printer is plugged into 230V when set to 115V and power is applied, the power supply will be seriously damaged. On the other hand, if 230V is selected and the printer is plugged into 115V, it will not be damaged, but the printer won't work.

Printers shipped to the US. and to Canada have the switch set to 115V. Printers shipped to other countries are shipped with the switch set to 230V. Either 115V or 230V will be visible in the windows on the switch. Most installations in the US. use 115V.

Use a slender object such as a paper clip that has been straightened. When setting the printer for 115 VAC, slide the switch to the left so it shows 115V. Slide it to the right for 230V operation.



Voltage Selector Switch

Select the Voltage (Models without Voltage Selector Switch)

If there is No Voltage Selector.....

Printers without a Voltage Selector Switch will automatically switch to the correct voltage setting. No additional action is necessary by the user.

Power Cords

Don't use two-wire extension cords or adapters that allow connection to ungrounded outlets.

A 6.5-foot power cord is shipped with the printer. The power cord included with printers sold for 115V installations in the US. and Canada is ready to use. International model printers are shipped with a power cord which can be used in a number of European countries.

For units to be operated at 115V, use a UL Listed/ CSA Certified three-conductor cord set, #18 AWG minimum, Type SVT or SJT. The maximum length is 15 feet. There must be a NENIA 5-15P (parallel blade, grounding type) plug on one end and a CEE 22/5 socket on the other end. The cord set should be rated 10A, 250V and have a grounding plug with safety approvals appropriate for the country in which the equipment will be installed.

For units to be operated at 230V inside US. and Canada, use a UL Listed/CSA Certified three-conductor cord set, #18 AWG minimum, Type SVT or SJT. The maximum length is 15 feet. There must be a NEMA 6-15P (tandem blade, grounding type) plug on one end and a CEE 22/5 socket on the other end. The cord set should be rated 10A, 250V and have a grounding plug with safety approvals appropriate for the country in which the equipment will be installed.

For units to be operated at 230V outside the US. and Canada, use a three-conductor cord set, EUR-H05VV-FG31,0 minimum, with a CEE 22/5 socket on one end. The cord set should be rated 10A, 250V and have a grounding plug with safety approvals appropriate for the country in which the equipment will be installed. The cord set should be marked HAR.

Plug It In and Turn It On

Make sure the power switch is off.

The power switch is on the back of the printer. Press the switch down to be sure it is off. Plug the female end of the cord to the power connector on the back of the printer under the power switch. Plug the male end into an AC outlet.

Turn on the power switch.

All four lights on the control panel come on for a few seconds. The print head moves to its home position on the left, if it's not already there. Three lights go out. The fault light stays on.

The LCD should say
Fault : Paper Out

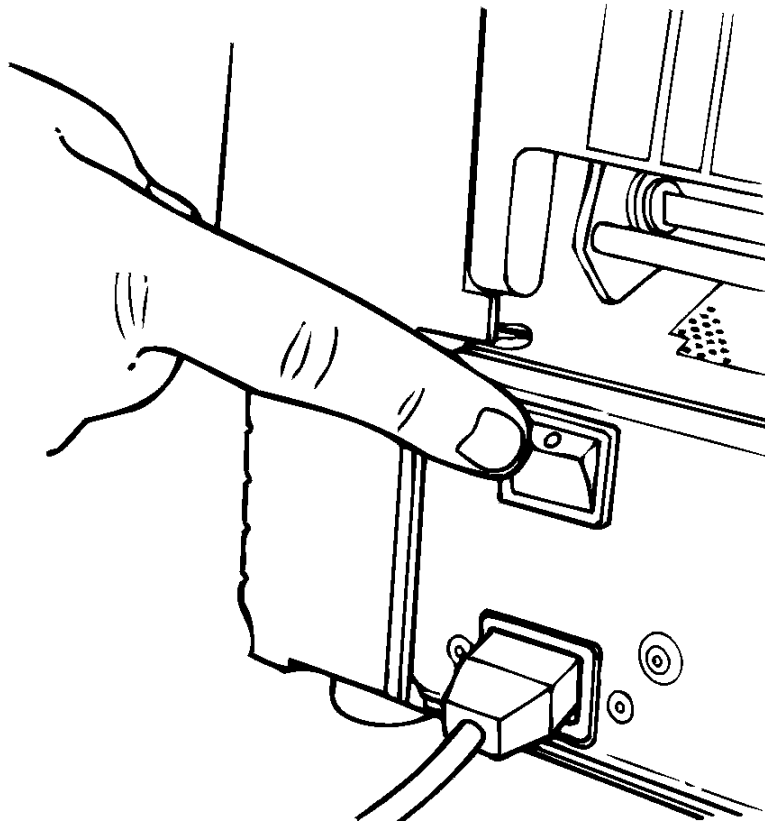
The liquid crystal display on the front panel shows this message until paper is loaded.

If the printer didn't come on ..

Check the AC outlet with another appliance. Make sure the voltage selector switch is set for the right voltage.

If the printer beeps ...

If the printer emits a series of short beeps, something's wrong. Note the number of beeps and call for service.



Install the Ribbon

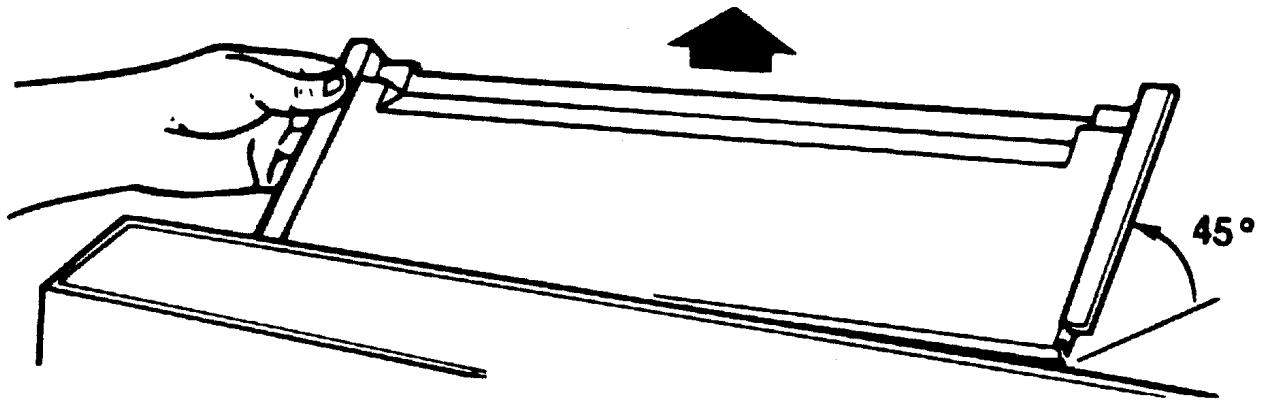
The printer must be powered up before a ribbon can be installed. The printhead has to back away from the striker bar to provide clearance to slide the ribbon guide onto the print head nozzle.

The print head automatically backs away from the striker bar any time the printer is turned on and there is no paper in front of the print head.

If there is paper in front of the print head -

Press the PARK/PATH key. The printer should retract the paper, and the LCD should say Fault:Paper Out.

Remove the top door.

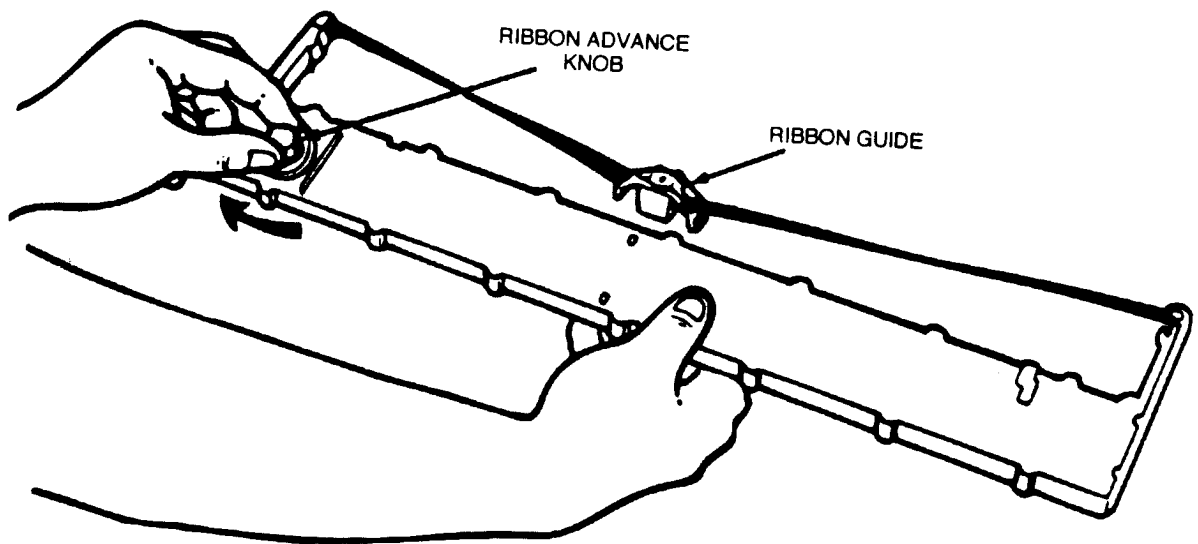


Unpack the ribbon and unwrap it.

Hold the cartridge as shown. Take the shipping tape off the ribbon guide. Squeeze the ears on the ribbon guide together and slip the ribbon guide up off the cartridge.

*If the ribbon is twisted,
untwist it.*

Untwist it as much as possible. There is a resident half-twist in the ribbon that may end up between the ribbon guide and one end of the cartridge. The ribbon will still work like this. Turn the ribbon advance knob to tighten the ribbon fabric. The ribbon will not work if the 1/2 twist is on the ribbon guide itself.

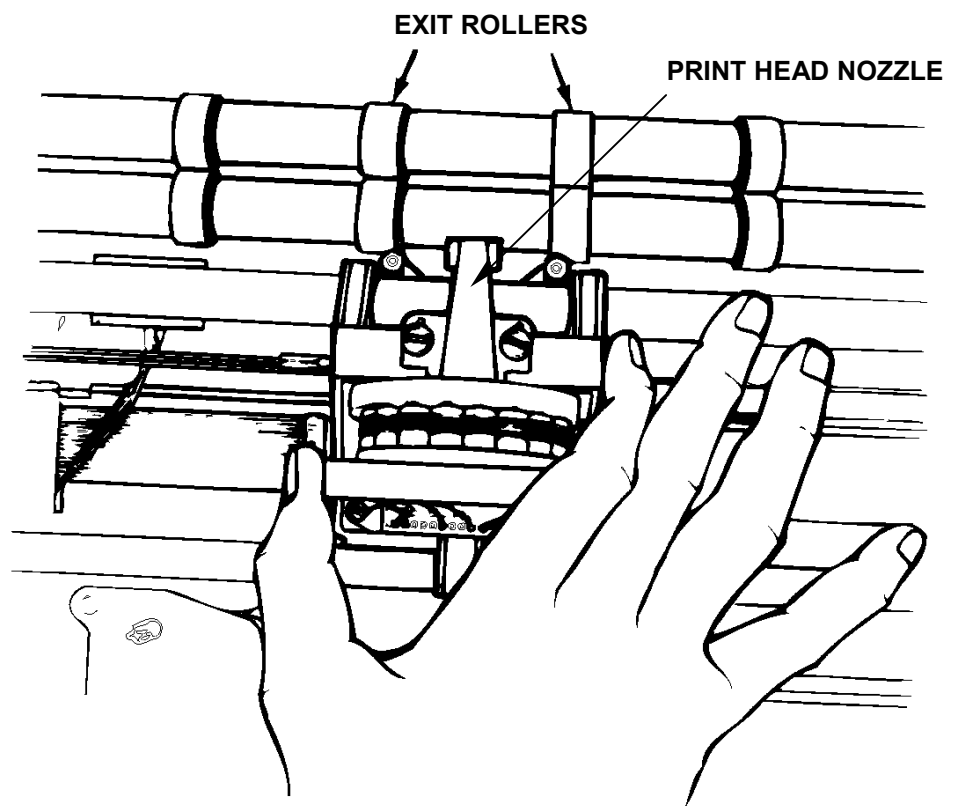


WARNING

If the printer has been printing for a while, the print head may be HOT !

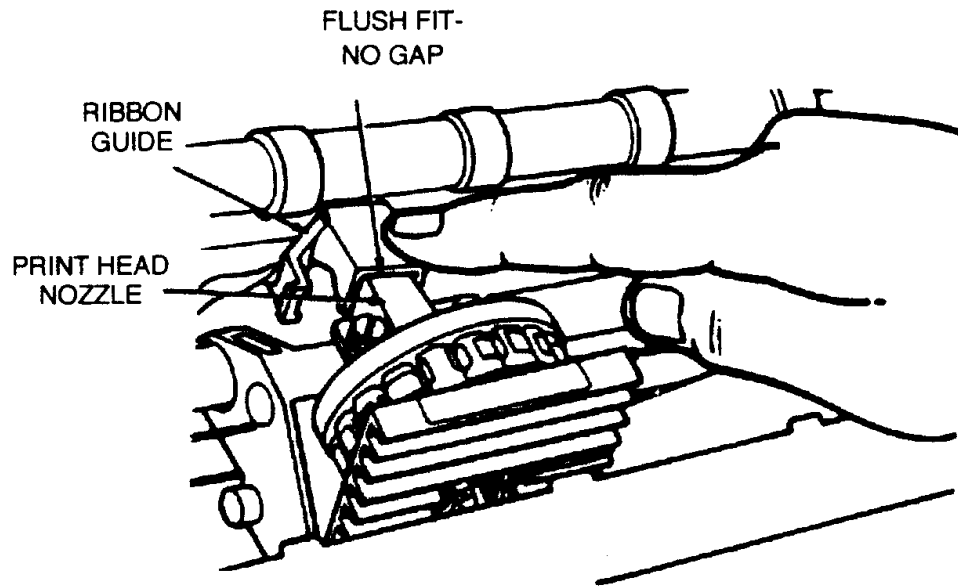
Move the print head left or right until it's centered between the middle pair of exit rollers.

The print head must be centered between pairs of rollers in order to install the ribbon guide onto the print head nozzle.



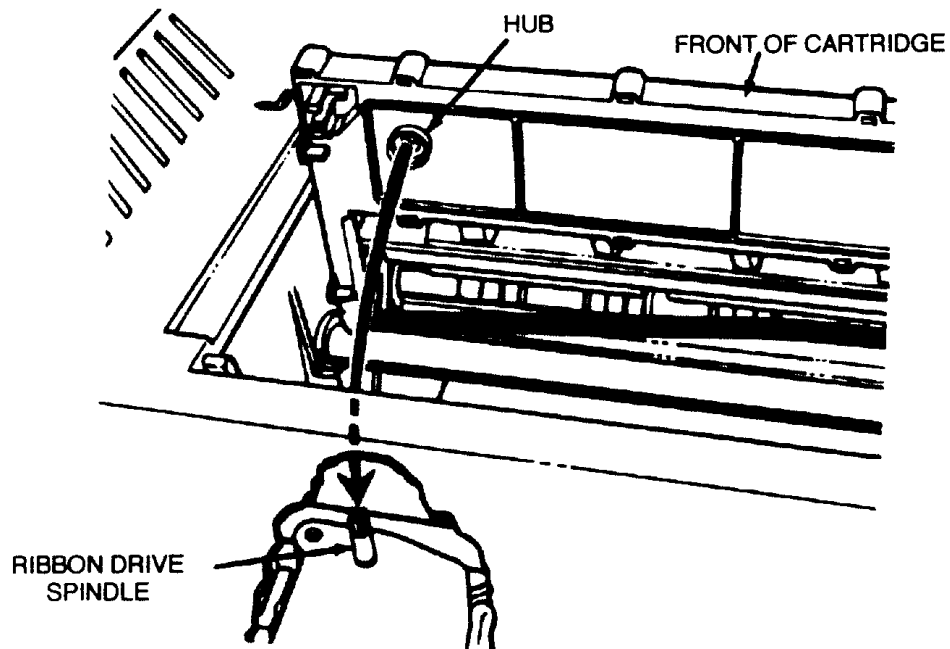
Wiggle the ribbon guide onto the print head nozzle and snap it down flush.

The ribbon guide fits snugly between the exit rollers. Center the ribbon guide over the print nozzle. Start with the front end of the ribbon guide pointing slightly up and then rotate it down onto the print head nozzle. It should snap down into place with moderate pressure.



Find the ribbon drive spindle..

Look down into the printer toward the left side and notice a small shaft sticking up vertically through a shiny plate.

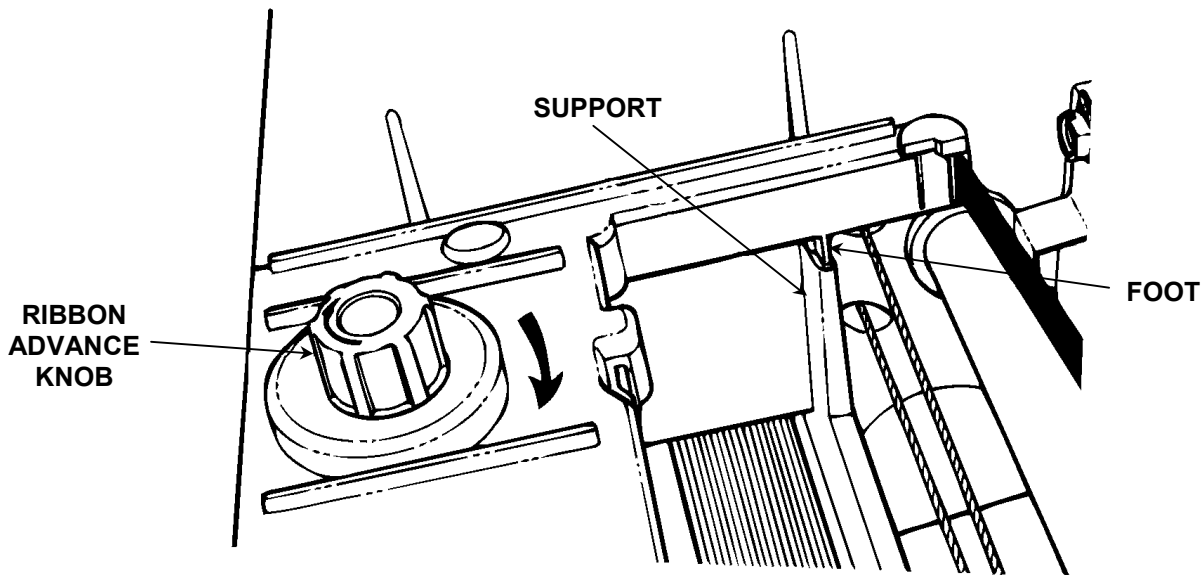


Seat the cartridge on the ribbon drive spindle..

Place the cartridge down in the printer about where it should go and wiggle it around until the ribbon drive spindle slips up into the hub of the cartridge. Turn the ribbon advance knob clockwise and feel the ribbon drive gears turning in the printer.

Snap the ribbon cartridge down on the supports.

There are feet on the bottom of the cartridge at the front corners. These snap onto corresponding feet in the printer. Gently push the front corners of the cartridge down at both ends until the feet snap into place.



Turn the ribbon advance knob clockwise to make sure the ribbon is taut.

Slide the print head back and forth ...(left to right and right to left

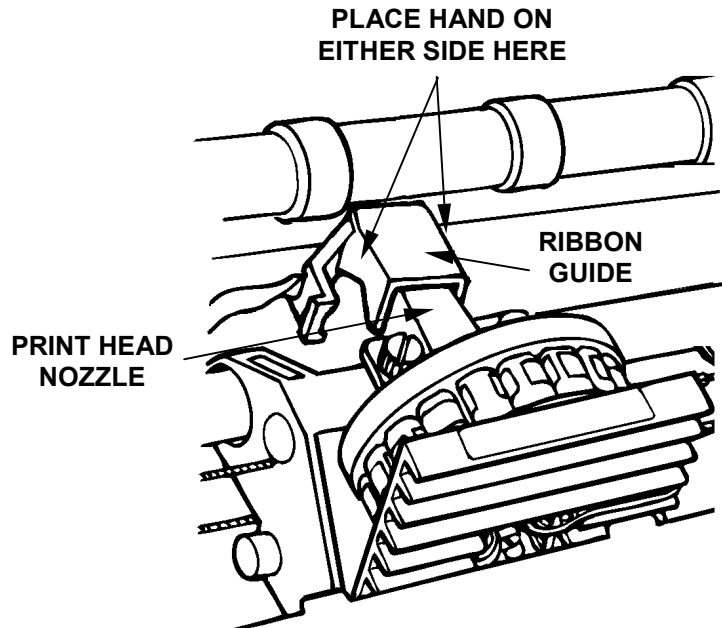
Verify that the print head moves smoothly without binding or snagging the ribbon.

Removing the Ribbon

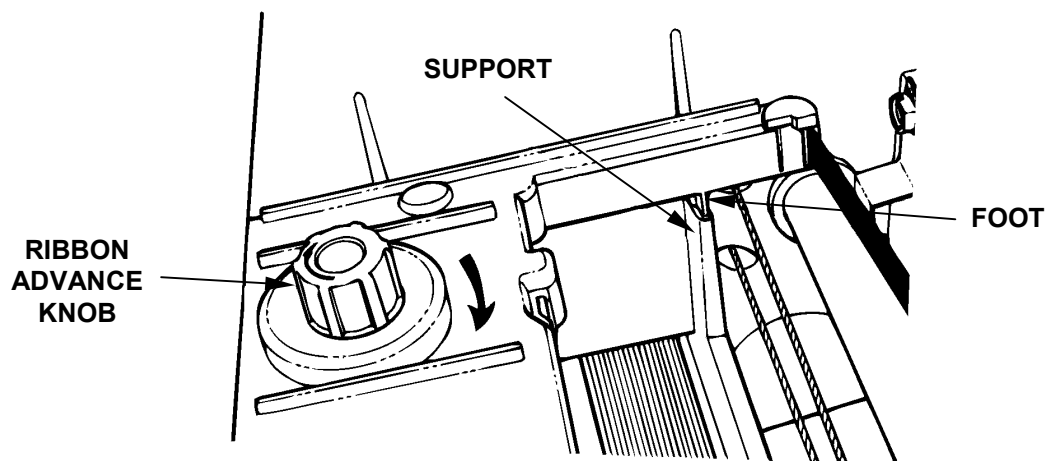
WARNING

If the printer has been printing for a while, the print head may be **HOT** !

To remove the ribbon use both hand and place one on either side of the ribbon guide. Pull upwards until the ribbon guide is dislodged.



When ribbon guide has been removed from the print nozzle, remove the ribbon cartridge by placed a hand at both ends of the cartridge and lifting the ribbon cartridge up and off the cartridge supports.



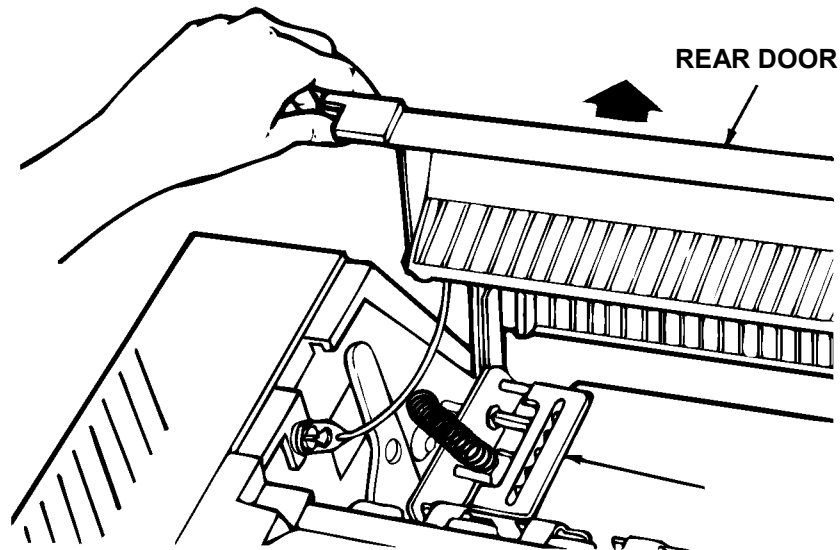
Put Paper in the Tractors

Each printer is shipped with a set of tractors installed in the rear. A second set of tractors is packed in a box for installation in the front/bottom paper path – see “Install the Front Tractors”, in Chapter 10. The procedure for loading sprocket-feed paper is the same for the rear, front, or bottom paper paths.

The tractor that holds the left edge of the paper will be referred to as the home-position tractor. The other tractor will be called the far tractor.

The factory final test used 14-inch wide paper. To run narrower paper the far tractor must be moved.

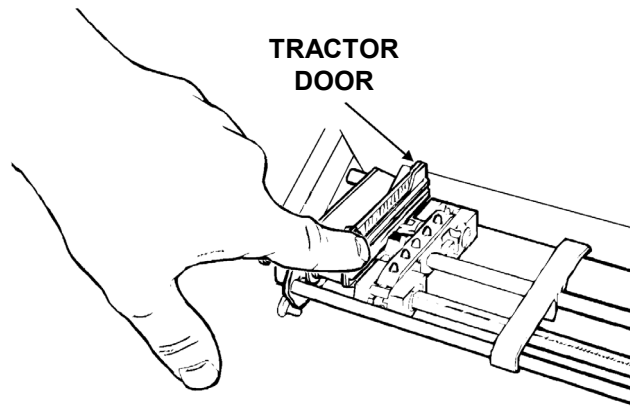
Open the rear door.



Remove tape.

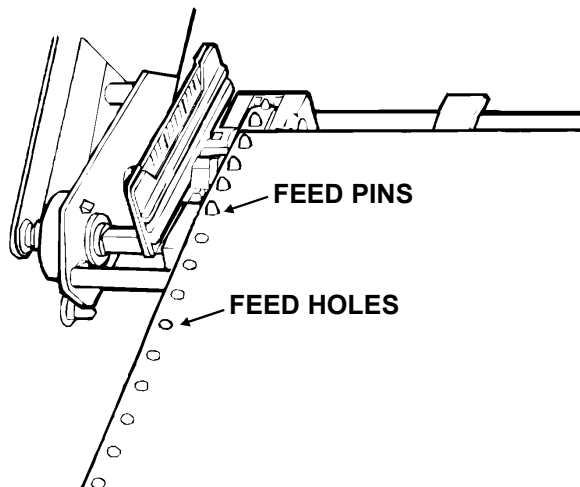
Each printer is shipped with a piece of tape across the rear tractor set to hold the tractor set in place. Remove this tape before loading paper.

Open the doors on both tractors.



Check the leading edge of the paper.

There must not be any tears wrinkles.



Put paper in the home position tractor.

For the rear path, the side of the paper to be printed on faces down. Sprocket-feed holes in the paper should engage three to five of the pins of the tractor belt. Make sure that the same number of pins are engaged on both tractors.

Close the home-position tractor door ...

Move the far tractor as necessary to fit your paper.

If necessary, pull the far tractor locking lever forward and adjust the far tractor's horizontal position so that it matches the width of the paper.

Put paper in the far tractor and close the door.

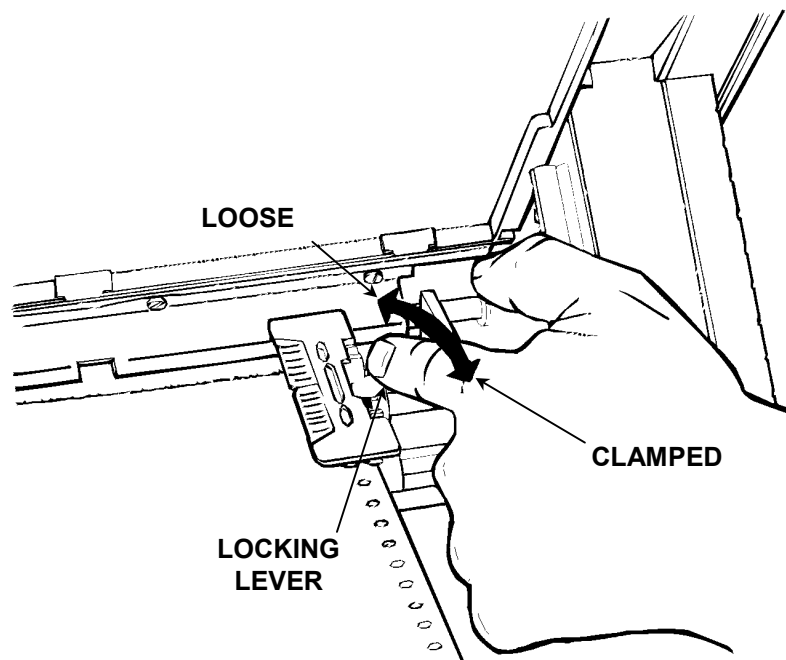
Move the far tractor to tighten the paper.

Lock the far tractor.

Make sure the leading edge of the paper is parallel with the tractor shafts. You must have the same number of pins engaged on both tractors.

Stretch the leading edge of the paper enough so it doesn't sag, but not so tightly as to distort the pin-feed holes in the paper.

Push the locking lever toward the rear of the printer to secure the tractor.



Load a Form

Close the Top Cover

If the LCD says

L O C K E D

See “Control Panel Lockouts”, Chapter 5.

Park / Path

Press and release PARK/PATH until the LCD says Path Rear.



1

Path > Rear

The rear paper path is now selected. Wait a few seconds for the function to time out.

Fault::Paper Out

The paper path selection function has timed out. The printer is now ready to load a form.

FF / Load

Press the FF/Load key. Paper should move into position to be printed.



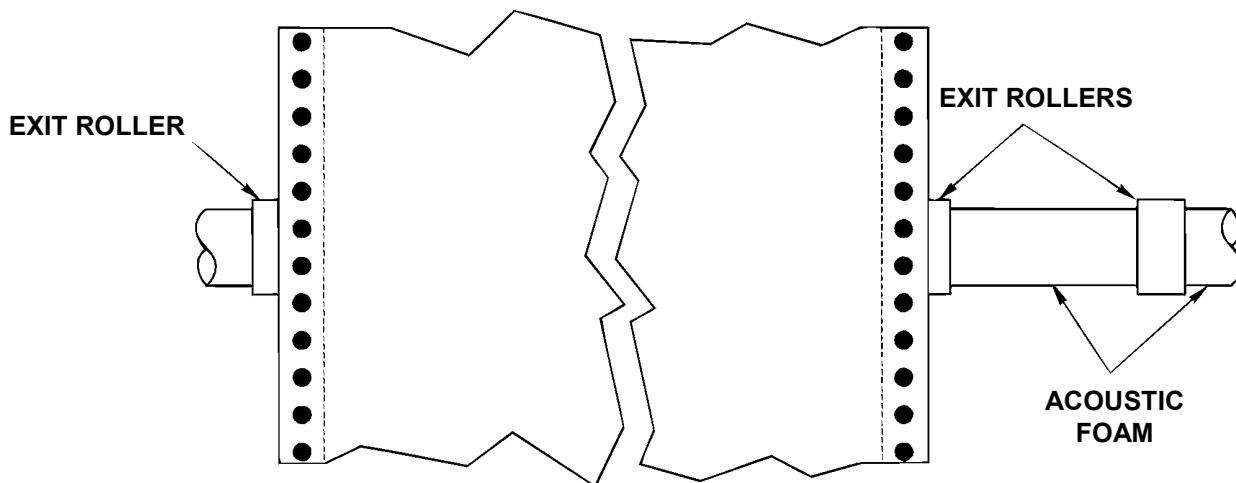
6

ADJUSTING GAP

The Fault light will go out and the print gap will be adjusted for the form that was just loaded.

Make sure the exit rollers engage the form.

Print lines may be skewed if the exit rollers do not engage the edges of the form. Open the top cover and look at the form. If the exit rollers do not engage the edges of the form, press the PARK / PATH key to park the form, and move the tractors as needed to align the form with the rollers.



If paper did not load

Check the paper path selection. Make sure that the paper is loaded in the tractors that correspond to the paper path selection. If paper did not load, take it out of the tractors and pull the jammed paper out of the printer from the tractor side and try again with a new sheet.

If paper is loaded, the fault light should be out.

If it is not, press the CLEAR key. When the printer is shipped, it is configured so that a paper-out fault is automatically cleared when paper is loaded. There is a software option that can be set so the CLEAR key must be pressed to clear the fault.

Format 4

The LCD shows which format is assigned to the current paper path. The format number can be 1, 2, 3, or 4. See Chapter 6 for information about formats.

Print a Test Pattern

The test pattern is called a rolling-ASCII pattern. The first 96 printable characters in the ASCII chart are printed over and over again for as long as the test pattern is running. The test pattern is printed according to how the printer is currently configured in terms of margins, font, quality, characters per inch (cpi), lines per inch (lpi), etc. Some reasons for printing a test pattern are :

- to test the printer when starting it for the first time.
- to see how a different combination of font, cpi, or lpi settings looks on the current paper type.

CAUTION: Don't print off the paper !

Printing off the paper can damage the print head. Do not use the 13.6" option unless using wide paper !

If the form is less than eight inches wide ...

Use the LCD Menu to set a right margin less than or equal to the form width. See Chapter 3.

Format 4

The LCD should show a format number, which can be from 1 to 4. The default is format 4.

If a fault message is displayed ...

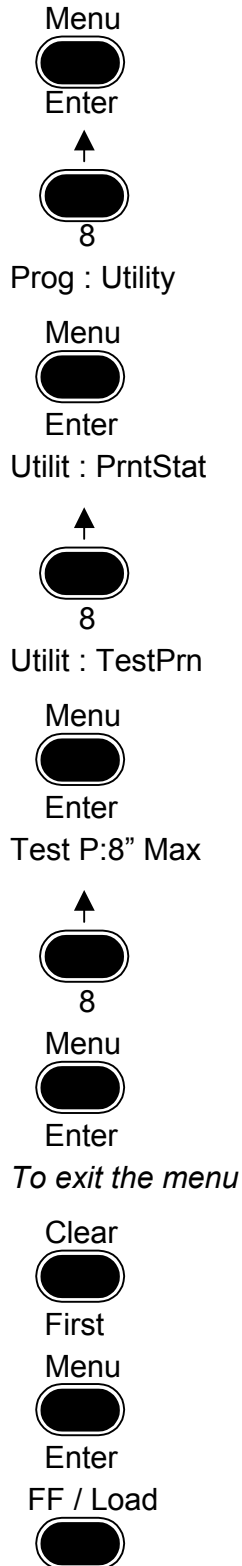
The LCD shows what the problem is. Clear the fault.

If some other message is displayed...

The LCD menu may have been accessed. Press FIRST and then ENTER to exit the menu.

The On Line light should be out.

If not, press the ON LINE key.



Press MENU to get into the LCD menu.

Press and release the UP ARROW key until the LCD say Prog: Utility. Use the DOWN ARROW key to go back if needed.

This is the menu selection that contains the test print selection.

Press ENTER

Press and release the UP ARROW key until the LCD says Utilit : TestPrn. Use the DOWN ARROW key to go back if needed.

This is the selection for the test print.

Press ENTER

This is the currently selected test pattern width.

Press the UP ARROW key to toggle between 8 inch and 13.6 inch test pattern widths.

Press ENTER to turn on the test pattern. Press ENTER again to turn the test pattern off.

Press the FIRST key.

Press the ENTER key.

To put top-of-form in front of print head (eject the partially covered page).

A Note About Print Head Gap Adjustment

Print head gap is the distance from the print head nozzle to the striker bar. If this gap is too tight, characters will smudge. If the gap is too large, characters will be light and ragged, the printer will be noisy, and print head wear will accelerate.

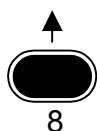
As shipped, the printer is configured to automatically adjust the print head gap whenever paper is loaded. The printer senses the thickness of a form when it is loaded and adjusts the print gap accordingly. The automatic gap adjustment process will leave a small black mark near the top of the first form as the form loads. Placing a sheet of paper in the gap at this time saves 1 form, but invalidates the gap.

The automatic print head adjustment can be fine tuned for best print quality. Semiautomatic head gap adjustment and fixed head gap may also be selected. For more information on these selections see Chapter 7.

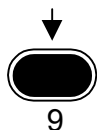
Adjust Top-of-Form

When loading the very first form, the printer feeds paper so that the top of the first printable line of characters is slightly below the top of the paper. Ideally, the application software that composes the page should advance paper to the first print line upon printing.

To adjust vertical paper position, make sure the printer is not in the menu mode. Use the UP ARROW and DOWN ARROW keys to advance or retract the paper, much like a paper advance knob on some printers.



Moves paper up by 1/72 inch per click. Experiment with it and see how it works.



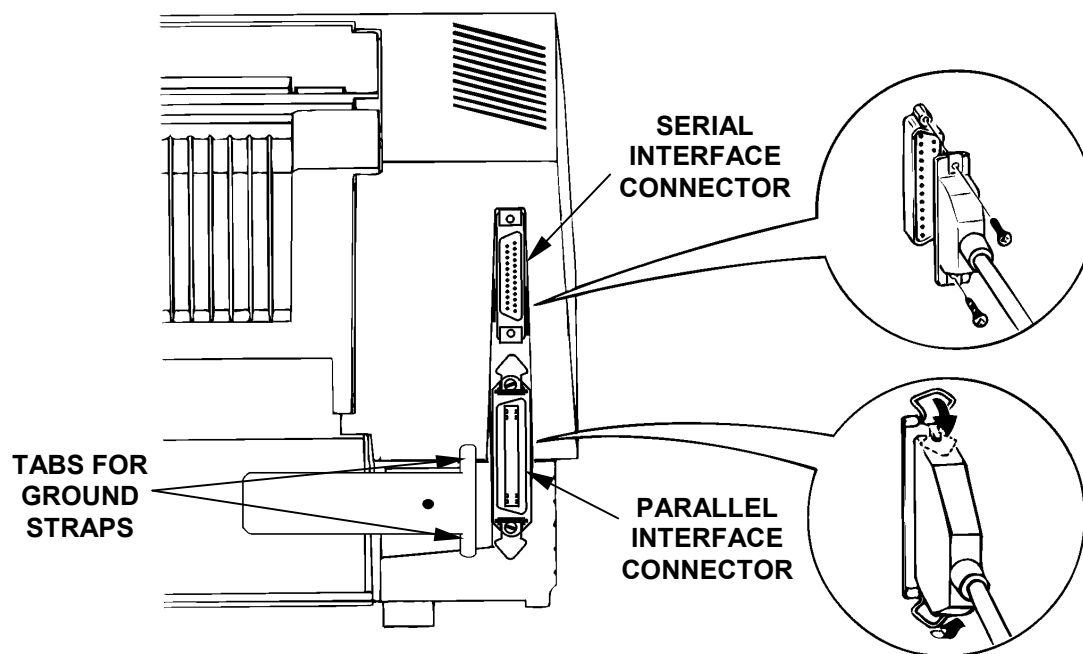
Moves paper down by 1/72 inch per click. Do not move paper down enough to print on the striker bar.

Instead of using the UP ARROW key to adjust the same amount of offset each time a particular form is loaded, that offset can be stored in a parameter called *top print reference* and saved to a format. If a top print reference is saved, paper will advance to the right place each time that paper path is loaded. See “Set a Top Print Reference” in Chapter 8.

Attach to a Data Source

The printer is shipped with the auto switching interface selected. A choice of serial or parallel interface is available.

CENTRONICS / IBM parallel and RS-232 serial printer cables are available from any computer store. The cable must be rated FCC Class B in order for the system to meet legal radio frequency interference limits. It should have a braided shield to provide best immunity from electrostatic discharge.



Connect the cable

Install the cable and tighten cable connector screws or when using the parallel interface, secure the cable to the printer with the bail wires on the printer connector.

Connect data ground strap

If the printer will be used on a printer stand, connect the ground strap to back of the printer at the tab(s) provided next to the interface plate. If a paper rack will be used with the printer, connect the ground strap to the back of the printer at tab(s) provided next to the interface plate.

When using the serial interface

See Chapter 4 to set serial parameters.

When using the parallel interface

See Chapter 4 to set parallel parameters.

Set the printer online

The ON LINE light should be on. If it isn't, then press the ON LINE key to turn it on. The printer is shipped with the auto switching interface selected.

Print something from the data source.

The printer will be able to print.

If it didn't work ...

Go to the next section and get a quick status to verify that the printer is set to the proper hardware interface. Note the emulation at the same time. It's easy to change either the interface selection or the emulation from the LCD menu.

Pinouts, signal descriptions, and other useful information about the interfaces is covered in Chapter 12.

Quick Status

Check the current printer settings in terms of font, characters per inch, lines per inch, interface, and emulation by pressing the MENU / ENTER key while the printer is online. The LCD steps through a list of the current settings for each of these five parameters.

LCD should say

Format 4

The format number will be from 1 to 4. If a fault message is displayed, clear the fault. If some other message is displayed, the printer is probably somewhere in the LCD menu. Press FIRST, and then ENTER, to get out.

The on light should be on.

If not, then press the ON LINE key.

Press MENU. The LCD will step through a short list of printer settings.



Line Registration on the first form

Precise line registration depends on the form being fully engaged by the exit rollers. The printer is not guaranteed to hold specified line registration for the first inch of the first form. This also applies to cut sheets loaded from the manual paper path.

Chapter 3. Control Panel

The control panel keys do different things depending on whether the printer is online, offline, or in a menu. Any button function associated with the menu is shown on the panel with blue lettering. This section assumes that the printer is set up as shipped, because it is possible to selectively lock out keys from the printed menu.

Control Panel Keys

*If the LCD says
LOCKED*

See “Control Panel Lockouts”, Chapter 5.

Park / Path



1

Press once to retract paper from the print path if a form is loaded, if two or more pages are past the exit rollers, pressing park/load will jam the paper. This is because the exit rollers move paper faster than the tractors. Be sure to remove extra pages/forms before pressing park/path. The paper remains in the tractors. If no form is loaded, press this key repeatedly to step through the paper path selections. Functions as the “1” key in menu entry mode.

Font



2

Press once to display the current font. Press repeatedly to step through the available font selections in the current “print quality”. Wait three seconds and the displayed selection becomes the current selection. See the LCD Menu Map for a list of fonts. Functions as the “2” key in menu entry mode. LDP + LQ fonts are available via LCD + Printed menu.

Print Quality



3

Press once to display the current print quality DP vs. LQ. Press again to change the print quality. Wait three seconds and the displayed selection becomes the current selection. Switches between letter quality and data processing resolutions. LQ produces better quality characters, and DP is faster. Functions as the “3” key in menu entry mode.

CPI



4

Press once to display the current characters per inch setting. Press repeatedly to step through available CPI settings. Wait three seconds and the displayed selection becomes the current selection. Some emulations support continuously adjustable character spacing. If the host sent down a setting that is not on the list, example: 11 CPI, then the LCD shows LS after the number. LS stands for Line Select. Functions as the “4” key in menu entry mode.

LPI



5

Press once to display the current lines per inch setting. Press repeatedly to step through available LPI settings. Wait three seconds and the displayed selection becomes the current selection. All emulations support continuously adjustable line spacing. If the host sent down a setting that is not on the list, example: 7 LPI, then the LCD shows LS after the number. Functions as the “5” key in menu entry mode.

FF / Load



6

FF (Form Feed) / Load prints any data remaining in the input buffer and advances paper according to the current form length. When paper is parked, FF / Load loads the form. Functions as the “6” key in menu entry mode.

LF



7

LF (Line Feed) prints any data remaining in the buffer and advances paper one line according to the current lines-per-inch setting. Use the line feed key carefully; if it is used to position a form in the printer, or to view a line under the print head, this affects the registration of the current, and possibly subsequent, pages. To see what’s under the print head, use the TEAR OFF key. Functions as the “7” key in menu entry mode.



8

Press and release to advance paper 1/72 inch per click. Hold it down to go faster. Functions as the “9” key in menu entry mode.



9

Press and release to retract paper 1/72 inch per click. Hold it down to go faster. Functions as the “9” key in menu entry mode.

Tear Off



7

Advances a form to the tear off position to tear off or view. Press again to retract paper. Paper will automatically retract after 15 seconds or, if data is received, the paper will be retracted and printing will begin. Remove a partially printed form by pressing FF first, and then TEAR OFF. See “Printed Menu”, Chapter 4 and “Set the Tear-off Distance”, Chapter 8 for more information regarding tear-off feature options. Functions as the “0” key in menu entry mode.

Clear



7

Press this key to clear a fault. Functions as the “First” key in the menu mode. In the menu mode press this key to return to the beginning of the menu.

On Line



Former

The ON LINE key toggles between offline and online as long as there is no printer fault and the printer is not in a menu. When the printer is online, it can print received data. When it is offline, printer settings can be changed, and test patterns and status reports can be printed. Functions as the “Former” key in the menu mode.

Format



1

Selects a format. Read “Formats”, Chapter 6 before pressing this key. This can inadvertently overwrite current parameters such as margins, font, LPI, CPI, tabs, form length, and so forth. Functions as the “decimal point” in menu entry mode.

Menu



Enter

When online, steps the LCD through current settings for font, CPI, LPI, path, interface, and emulation. Offline, enters the LCD menu. Functions as the “Enter” key in the menu mode.

LCD Menu

There are two menus in the printer: the LCD menu and the printed menu. The language of the LCD messages can be changed by using the LCD menu.

The LCD menu includes the items that are changed most frequently. The LCD menu is convenient when running preprinted forms to change a setting without using any paper.

There are submenus under the main LCD menu selections. The features are located at the last level of a submenu. At the feature level, a selection is displayed preceded by the greater-than symbol “>”, or the arrow. The arrow indicates that this is the current selection. See “LCD Menu Map” in this chapter.

The automatic head gap offsets and the semiautomatic head gap settings are accessible only from the LCD menu. See Chapter 7.

All other LCD menu selections in addition to many others are also available in the printed menu. See Chapter 4. The printed menu allows the user to see a list choices before selecting one, and to some extent provides a hard-copy record of what was changed. The printed menu is accessed through the LCD menu.

To access the LCD menu

To ON LINE light must be out.

If not, then press the ON LINE key.

Format 4

The LCD should show the last format that was selected. The number can be from 1 to 4.

If a fault message is displayed ...

If some other message is displayed ...

Menu

Enter
Prog : Exit

↑

8
↓

9

Menu

Enter

On Line

Former

Clear

First

Explore

Clear

First

Menu

Enter

The LCD shows what the problem is. Clear the fault.

The printer is probably somewhere in the LCD menu. Press FIRST and then ENTER to exit.

Press MENU to get into the LCD menu.

This message indicates the top level of the LCD menu.

The UP ARROW and DOWN ARROW keys step through circular lists of 18 selections. When the desired selection is displayed, press ENTER.

ENTER means “yes, this is the desired category,” or “yes, this is the desired selection.”

FORMER moves the printer back/up one level in the menu.

FIRST moves to the top menu level; PROG : EXIT choice

Browse around in the LCD menu and remember to use FORMER or FIRST to exit the sub-menus. Pushing ENTER when an option is displayed will change the printer configuration.

Press the FIRST key.

Press the ENTER key.

LCD Menu Map

The following are examples of the format of the LCD messages:

>active now	The current selection on a multiple-choice menu is preceded by the greater-than symbol >
Right: 8.500	When a number need to be entered, the current setting is preceded by a colon:
Right> 8.000	Then the arrow flashes after you press ENTER to save your change.

The following abbreviations are used in the LCD menu:

Auto SW - Both serial and parallel interfaces are selected.

Char Set - Character Set. Select either of IBM character sets 1 or 2. Applies to ANSI and Epson as well as to the two IBM emulations.

CPI - Characters per Inch.

Form Leng - Form Length.

IntFace - Interface. Choices are auto switching, serial, or parallel.

LPI - Lines per Inch.

Msg Lang - Message Language. The printer can present the LCD messages in any of five languages.

PrFormat - Print a Format report. This shows what's in each of the four stored formats, but not the active format.

PrintStat - Print a Status sheet. This shows what's in the active format; in other words, what the printer is set to do right now.

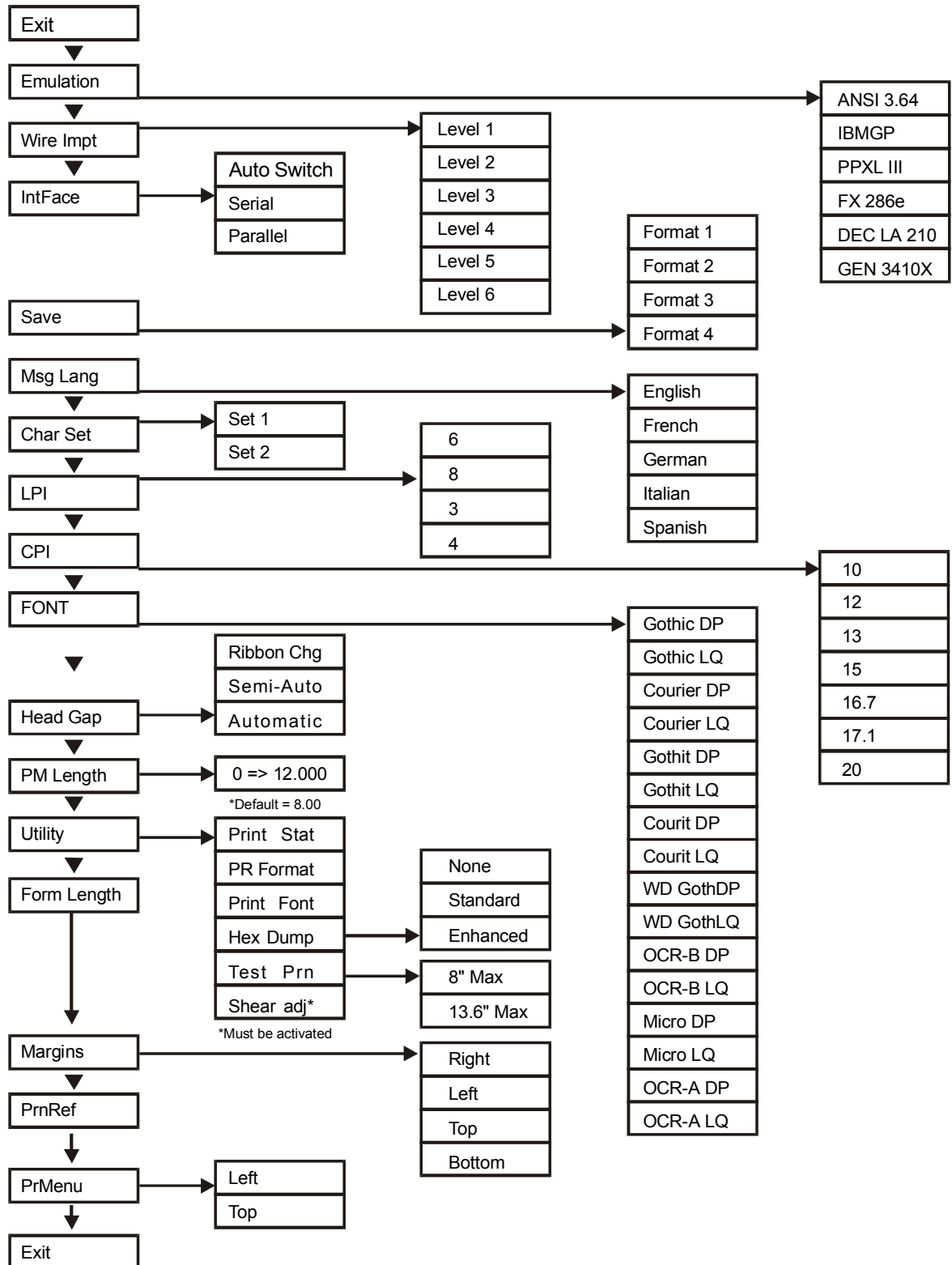
PrMenu - Printed Menu. There is a printed menu that goes deeper into the configuration than does the LCD menu. See Chapter 4.

PmRef - Print Reference. Use to set a top offset and also a left offset to position printing on the page. See Chapter 7.

Test Pm - Test Print. This prints a rolling-ASCII pattern that reflects the current font, margins, line and character spacing, and so forth.

Wire Impt - Adjust impact of print head wires on ribbon. Level 3 is default. The higher the level number the greater the impact.

With the display showing the current format, press the MENU key



Select the Emulation

When the printer is shipped, the emulation is set to ANSI (American National Standards Institute). This printer-control protocol is the native language of the printer. The printer's bar code / rotatable oversized character features are accessible via ANSI control sequences.

ANSI is not widely supported by off-the-shelf office applications. If the printer is attached to a personal computer, and the printer is used for general-purpose office work, the emulation may be changed to Epson FX286e, Dec LA210, CENICOM 3410X, IBM Proprinter XL III, or IBM-CP.

This section explains how to change emulations from the control panel. Emulations can also be changed from the printed menu or by sending escape sequences from the host. See the ANSI chapter in the *Programmer's Manual* for details.

Whatever method is used to set the emulation, the printer will power up in that emulation until the setting is changed.

Note: Emulation selections cannot be saved to the individual user-defined formats 1-4. The emulation selection applies to all formats. When an emulation is chosen, that selection applies to the active format and does not change when any of the four user-defined formats are made active.

The emulation selection is saved in nonvolatile RAM; when the printer is turned on, it will be in the same emulation it was in when it was turned off.

The ON LINE light must be out

If not, press the ON LINE key.

Menu



Enter



9

Press the MENU key to enter the LCD Menu.

Press and release the DOWN ARROW key one time. The LCD says **Prog:Emulation.**

Prog : Emulation

Menu



Enter

Press ENTER. This means "Yes, this is the desired function."



Press and release the DOWN ARROW key until the desired emulation is displayed. The list is circular; keep pressing the arrow key to cycle through the list.

When the desired emulation is displayed ...



Press ENTER to make that selection. The selection will flash three times to show that it was saved.



Press FIRST to go back to the top of the LCD menu.

Prog : Exit



Press ENTER to confirm existing the LCD menu.

Status Sheet

A status sheet can be printed that shows how the printer is presently configured (the active format is printed). This can be an invaluable reference when something is changed or a prior configuration needs to be used. When the printer is configured for a particular print job, print and save the status sheet for later use.

The On Line light should be out.

If not, press the ON LINE key.

Menu



Enter



8

Press the MENU key to access the LCD Menu.

Press and release the UP ARROW key until the LCD says Prog : Utility. Use the DOWN ARROW key to go back if needed.

Prog : Utility

Menu



Enter

Press ENTER.

Utilit : Prnt Stat

This is the first item on the list.

Menu



Enter

Press ENTER to print the status sheet.

Clear



First

Press the FIRST key to go back at the top of the LCD menu.

Prog : Exit

Menu



Enter

Press ENTER to confirm that you want to exit the LCD menu.

Tear Off



0

Press TEAR OFF and tear off the status sheet.

Chapter 4. Printed Menu

Experiment with the printed menu to see how it works. To keep the printer as originally configured, select Abort instead of Save when exiting the printed menu.

This menu is printed in English only.

The menus are printed at 10 CPI, 6 LPI, in the ANSI default font. This is normally Gothic DP, but this can be changed by using the SGR Extension command described in the ANSI chapter of the *Programmer's Manuals*. The only other setting that affects the way the menus look are the margins in the active format.

The > Arrow Means the Option Is Enabled

At the last level of a menu branch, some options on the list may be preceded by the greater-than symbol (or arrow). The arrow points to options that are currently enabled.

In some submenus, the arrow points to one of a mutually exclusive set of options. For instance, only one font may be selected.

In other submenus, the options aren't mutually exclusive. In the Printing Mode submenu, for example, Unidirectional Graphics and Unidirectional DP may be selected at the same time.

When options aren't mutually exclusive, entering an option number toggles that option. If Unidirectional Graphics is currently off and the number for that option is entered, it will be turned on, and vice versa.

Sometimes Values Are Entered

Instead of offering multiple choices, the printer requires actual values for features such as line spacing and margins. Use the numbers and decimal point on the bottom of the keys to make numeric entries. The context of a particular menu indicates the units of measure required, such as columns, inches, etc.

Decimal fractions may be included, in which case the printer might round off the entry to the nearest number that the current emulation supports.

The printer can be set to accept decipoints for margins and form length where it would normally expect inches; this is controlled by software options 9 and 10 on the printed menu. See "Software Options" in this chapter.

Access the Printed Menu

The On Line light should be out.

If not, press the ON LINE key.

Menu



Enter

Press ENTER.

Prog : Exit



8

Press the UP ARROW key one time.

Prog : PrMenu

Menu



Enter

Press ENTER. A menu list of seven selections should be printed. If the margins are too narrow to read the list, see the next section, "Margins for Menu Listings". The LCD indicates what numbers were entered, but the printout shows what to do next.

Margins for Menu Listings

In the printed menu, the lists of options are designed to be printed with a left margin of 0 inches and a right margin of at least 8.0 inches. If the margins selected are greater than the left margin of 0 inches and less than the right margin of 8.0 inches, then change the margins prior to using the printed menu.

If the margins are too narrow, then exit the printed menu. Press FIRST and then 1.1 and Enter to abort. Enter the LCD Menu by pressing FIRST and then ENTER. Note the format number shown on the LCD. This is the currently assigned format. Use the FORMAT key to select a different format while printing the menu. Use the FORMAT key to select the old format when the menu printing is finished.

FORMER and FIRST

These keys provide navigation in the printed menu.

On Line



Former

Clear



First

The FORMER key returns to the previous menu level.

The FIRST key returns to the start of the printed menu.

Printed Menu Map

Here are the options on the main menu. Details are on following pages.

1. Exit Printed Menu
2. Format
3. Interface Parameters
4. User Defined Options
5. Emulation Dependent Options
6. Software Options
7. Status Report
98. Security Menu (selection not printed)
99. Hardware Menu (selection not printed)

Menu



Enter

After pressing a number for a selection, press ENTER.

2. Format

1. Modify Format

1. Format # 1
2. Format # 2
3. Format # 3
4. Format # 4
5. Active Format

1. Print Format

1. Fonts

1. Gothic DP
2. Gothic LQ
3. Courier DP
4. Courier LQ
5. GothicIt DP
6. GothicIt LQ
7. CourierIt DP
8. CourierIt LQ
9. WD Gothic DP
10. WD Gothic LQ
11. OCR-B DP
12. OCR-B LQ
13. Micro DP Gothic
14. Micro LQ Gothic
15. OCR-A DP
16. OCR-A LQ

2. Character Spacing *

3. Line Spacing *

4. Printing Mode

1. Unidirectional Graphics
2. Unidirectional DP
3. Unidirectional LQ
4. Bold Print
5. Shadow Print
6. Auto <CR> on <LF>
7. Auto <LF> on <CR>
8. Auto <CR> on Vertical Tab or <FF>
9. Proportional Print
10. Underline Mode
11. RESERVED
12. Full Width Underline Mode
13. Overline Mode
14. Double Line Feed Mode
15. Perforation Skip
16. Power-up with Quality Print
17. Reduced Maximum Vertical Slew
18. Auto Tear-off on Form Feed

* Enter values directly

5. National Character Substitutions

- | | |
|--------------------------------------|------------------------------------|
| 0. US ASCII | 27. ROMAN 8 Hp |
| 1. German | 28. Mazowia |
| 2. French A | 29. ISO 8859-9 Latin 5 |
| 3. French B | 30. Turkish |
| 4. French Canadian | 31. Greek |
| 5. Dutch (Netherlands) | 32. Kamenicky |
| 6. Italian | 33. FX 286e France |
| 7. U.K. | 34. FX 286e Germany |
| 8. Spanish | 35. FX 286e UK |
| 9. Danish/Norwegian A | 36. FX 286e Denmark I |
| 10. Danish/Norwegian B | 37. FX 286e Sweden |
| 11. Danish/Norwegian C | 38. FX 286e Italy |
| 12. Danish/Norwegian D | 39. FX 286e Spain I |
| 13. Swedish/Finnish A | 40. FX 286e Japan |
| 14. Swedish/Finnish A | 41. FX 286e Norway |
| 15. Swedish/Finnish C | 42. FX 286e Denmark II |
| 16. Swedish/Finnish D | 43. FX 286e Spain II |
| 17. Swiss | 44. FX 286e Latin America |
| 18. Danish/Norwegian E | 45. MS Code Page 864 IBM PC Arabic |
| 19. ISO 8859-1 Latin 1 | |
| 20. ISO 8859-2 Latin 2 | |
| 21. ISO 8859-3 Latin 3 | |
| 22. ISO 8859-4 Latin 4 | |
| 23. MS Code Page 437 ENGLISH | |
| 24. MS Code Page 850 MULTI 2 | |
| 25. MS Code Page 852 SLAVIC | |
| 26. MS Code Page 863 Canadian/French | |

2. Page Format

1. Clear Values

1. All Horizontal Tabs
2. All Vertical Tabs
3. All Margins
4. Top Print Reference
5. Left Print Reference
6. Horizontal Tabs by location
7. Vertical Tabs by location

2. Set Values

1. From Length
 2. Top Margin
 3. Bottom Margin
 4. Left Margin
 5. Right Margin
 6. Horizontal Tabs
 7. Vertical Tabs Input solicited in INCTTES taken as decept
 8. Top Print Reference
 9. Left Print Reference
- 2.3 Emulation Link

2. Print All Formats Values

3. Assign Paper Path

1. Single Document Inserter
2. RESERVED
3. RESERVED
4. Bottom / Front
5. Rear

3. Interface Parameters

1. RS-232 C Serial

1. Baud Rate

1. 110
2. 300
3. 600
4. 1200
5. 2400
6. 4800
7. 9600
8. 19200

2. Character Bit Definition

1. 1 Start, 7 Data, Parity, 1 Stop
2. 1 Start, 7 Data, Parity, 2 Stop
3. 1 Start, 7 Data, 1 Stop
4. 1 Start, 7 Data, 2 Stop
5. 1 Start, 8 Data, Parity, 1 Stop
6. 1 Start, 8 Data, Parity, 2 Stop
7. 1 Start, 8 Data, 1 Stop
8. 1 Start, 8 Data, 2 Stop

3. Parity

1. Even
2. Odd
3. Space
4. Mark
5. Ignore Received Parity

4. Interface Control

1. DC1 / DC3 Control

1. Ready / Busy
2. Online / Offline
3. Fault
4. Transmit DC1s Until Data Received
5. Transmit DC3s Until No Received Data
6. Transmit DC1 On Power-up
7. Transmit DC1s On No Data Received.

2. CD (DTR) Lead Controlled By:

1. Ready / Busy
2. Online / Offline
3. Fault

3. CA (RTS) Lead Controlled By:

1. Ready / Busy
2. Online / Offline
3. Fault

4. SCA (SRTS) Lead Control By:

1. Ready / Busy
2. Online / Offline
3. Fault

5. Select Transmission Setup

1. Transmission Disabled
2. CB (CTS) Lead Controls Transmission
3. CC (DSR) Lead Controls Transmission

6. Lead Polarity

1. CA (RTS) Lead Active High
2. CB (CTS) Lead Active High
3. CC (DSR) Lead Active High
4. CD (DTR) Lead Active High
5. SCA (SRTS) Lead Active High

7. ETX / ACK Protocol

1. ACK When Buffer Available
2. ACK After Print

8. Ready Indication

1. Ready Indication Disabled
2. Flash Online LED for Not Ready

2. Centronics Parallel

1. Lead Control

1. Busy Lead Control

1. Offline
2. Fault
3. Paper Out
4. Busy

2. Fault Lead Control

1. Offline
2. Fault
3. Paper Out
4. Busy

3. ACK Lead Control

1. Inhibit ACK for Online->Offline
2. Inhibit ACK on Paper Out
3. Inhibit ACK on FAULT
4. Pulsed during Busy

2. Lead Polarity

1. Fault Active Low
2. Select Active High
3. Paper Out Active High
4. Strobe Active Low
5. Busy Active High
6. ACK Active Low

3. Select Prime Options

1. Prime on Input Prime Lead
2. RESERVED
3. Prime on Received DEL

3. AutoSwitch Option

4. Buffer Options

1. Set Receive Buffer Size
2. Set Low Trip Point
3. Set High Trip Point

5. Ignore Received Character

1. Ignore Received Character
2. Select Character to be Ignored

6. Test Options

1. Standard Hex Dump
2. Enhanced Hex Dump
3. 80 Column Loop-back

4. 132 Column Loop-back

4. User Defined Options

1. Auto Wrap – **NOTE:** If the print reaches the right margin before a line terminator is received, Auto Wrap enabled will start a new line. Otherwise, data between right margin and next line terminator will be discarded.
2. Slash Zero
3. RESERVED
4. RESERVED
5. Power-up Online
6. Power-up to Powered Down State
7. Paper Tear-off Time-out – Paper will be retracted 15 seconds (default) after the tear-off key is pressed.
8. Beeper
9. RESERVED
10. Setup Mode Inactivity Time-out – **NOTE:** The printer will leave the printed menu mode after 15 minutes of inactivity.
11. RESERVED
12. Form Parameters Change on Paper Path Change
13. Two Box Option, Auto-load of Continuous Forms

5. Emulation Dependent Options

1. Select Emulation

- | | |
|-------------------|------------------|
| 1. ANSI 3.64 (00) | 4 FX286e(22) |
| 2. IBMGP (20) | 5 DEC LA120(25) |
| 3. PPXL III (21) | 6 GEN 3410XL(28) |

2. User Selectable Emulation Options

1. Compress characters on CPI change to avoid overlapping print (ENB)
2. Reserved (DIS)
3. Enable 8-bit control functions (80 – 9F hex). Option 9 must be off. (DIS)
4. Respond to control codes while in graphics mode (ENB)
5. Respond to Reset command (ENB)
6. Ignore ESC (escape) sequences (DIS)
7. ANSI – Select/Deselect printer by DC1 / DC3 in parallel interface (DIS)
8. Enable enhanced print ESC sequence (1=bold, 0=shadow) (ENB)
9. Default to character set 2 (DIS)
10. Enable answerback – ANSI and DEC emulations (DIS)
11. Map Italics to high-order characters in Epson (DIS)
12. Abort ANSI escape sequences containing control codes after the CSI. (DIS) – As shipped, if the printer finds a control code imbedded in an otherwise valid ANSI escape sequence, then the printer executes the control code, as well as the affected escape sequence. If option 12 is enabled, then the escape sequence is aborted and the control code is discarded.
13. Reserved (DIS)
14. Ignore vertical tab control code when no tabs set – applies to ANSI (DIS)
15. Enable CAN code – applies to IBM and Epson (DIS)

16. PPXL – discard p1 and p2 of ESC [p1 p2 p3 sequences (DIS).
17. Epson – default to 12-inch form on software reset (DIS)
18. PPXL – Power up to powered down state (ENB) – For the printer to power up to Proprinter defaults, disable this option.
19. ANSI – Strip the eighth bit from all received data (DIS).
20. Allow Epson emulation to print 8-bit character sets (DIS).
21. Epson - <ESC> @ invokes format assigned to current paper path – (ENB). For the printer to reset to the Epson defaults, disable this option.
- 22-32. Reserved.

NOTE: These options can be set from the host. See the ANSI chapter in the Programmer's Manual.

6. Software Options

1. Back up to top of oversized characters (DIS)
2. Back up to top of bar codes (DIS)
3. Use staggered dot pattern for low-resolution bar codes (ENB)
4. Print guard bars on applicable bar codes (DIS)
5. SI/SO control codes toggle bar code and oversize characters (DIS)
- 6-8 Reserved (DIS)
- 9-10 Units of measure for entering values in the printed menu (LCD menu uses inches only.)

9	10
DIS	DIS inches (default)
ENB	DIS decipoints (1/720 inch)

11. When a fault condition occurs in the printer (e.g. paper out), then the printer will go offline (ENB).
12. Bottom margin tracks form length (ENB)
13. Paper out fault is automatically cleared when paper is detected (ENB)
14. Load format assigned to the current paper path on power-up (DIS)
15. Auto tear-off after FF after 5 seconds (DIS)
16. Map Danish / Norwegian E substitutions to all character sets (DIS) – The only ASCII characters affected by the Danish / Norwegian E (ANSI international substitution set # (18) are 155 and 157 decimal. These locations are not normally printable characters. To print characters 155 and 157, you must first enable character set 2 from the emulation options menu, regardless of the status of option 16 on this menu. If option 16 on this menu is enabled, then the Danish / Norwegian substitutions are mapped to character locations 155 and 157 in all international character sets.
17. Receive data in local state (DIS)
18. Reduce carriage speed to 70% for line draw characters and graphics (ENB)
19. Send a busy signal every 20 characters when offline. (DIS) Only applies if option 17 is enabled
20. Reserved (DIS)
21. Strip leading and trailing white space from POSTNET bar codes and change density from 20 dpi, to 24 dpi (DIS)
22. Print POSTNET bar codes unidirectionally (DIS)
23. Disables print head homing before retracting paper during tear-off or autoview (DIS)

24. Reduced slew rate for tear-off function (DIS)
25. Enable paper shearer on FF (DIS)
- 26-32. Reserved (DIS)

NOTE: These options can be set from the host. See the ANSI chapter in the Programmer's Manual.

7. Status Report –

Prints a status report

98. Security Menu*

1. Menu Lock – Locks out the printed menu until a user-defined combination is entered.
2. Online Key Lock – Locks the printer online until a user-defined combination is entered.
3. Keys Locked when Online
 1. Park / Path
 2. Font
 3. Quality
 4. CPI
 5. LPI
 6. FF
 7. LF
 8. Fine Adjust Up
 9. Fine Adjust Down
 10. Tear-off
 11. Reserved
 12. Format
 13. Lock all keys
 14. Unlock all keys

* This option not printed, but is available

4. Keys Locked when Offline

1. Park
2. Font
3. Quality
4. CPI
5. LPI
6. FF
7. LF
8. Fine Adjust Up
9. Fine Adjust Down
10. Tear-off
11. Reserved
12. Format
13. Lock all keys
14. Unlock all keys

2. Flight Time Compensation

1. **Velocity Range 1**
2. Velocity Range 2
3. Velocity Range 3
4. Velocity Range 4
5. Velocity Range 5
6. Velocity Range 6
7. Velocity Range 7
8. Velocity Range 8
9. Velocity Range 9
10. Velocity Range 10
11. Velocity Range 11
12. Velocity Range 12
13. Print All Current Flight Time Patterns

99 Hardware Config Menu *

* This option not printed,
but is available

1. Hardware Options

1. Manual Sheet Feeder (Rear)
2. Tractors (Rear)
3. Tractors (Bottom/Front)
4. Paper Shear
5. Paper Motion Detector
6. TX/CX Adapter
7. Network Print Server

Exit the Printed Menu

These keys provide navigation in the printed menu.

Clear 	The FIRST key goes to the top level of the printed menu at any time.
First Park / Path 	Press 1 to select Exit.
1 Menu 	Press the ENTER key to exit the printed menu. The printer asks “abort or save” menu changes.
Enter Park / Path 	Press 1 to abort or 2 to save.
1 Font 	
2	

The printer is now in the LCD menu. To get out of the LCD menu and back online, press FIRST, ENTER, and then ON LINE.

Clear 	Press the FIRST key.
First Menu 	Press the ENTER key.
Menu Enter On Line 	Press the ON LINE key.
On Line Former	

Format : 4

Chapter 5. Control Panel Lockouts

When **LOCKED** is displayed on the LCD, it is usually because the printer is online and the user is pressing one of the keys that are supposed to work offline only, like FONT or CPI. If **LOCKED** is displayed and the ON LINE light is on, press the ON LINE key to turn it off.

If a user tries to go offline and gets flashing lights and a prompt to enter a code, the printer has been locked online, either get the combination or resort to one of the remedies described later in this chapter to recover. The printed menu can also be locked out in a similar way.

If **LOCKED** is unexpectedly displayed, a user may have locked out some of the keys. This printer allows considerable control over which control panel keys work online and which keys will not.

Lock the Printer Online

To lock the printer online until a combination of digits is entered, access the security menu, option 98, on the main menu. This option does not print out but is available to the user. This effectively locks out both the LCD menu and the printed menu, as well as the quick selections like FONT and CPI.

A sequence of up to five digits may be used for a combination, but the highest number allowed is 65535. To remove a lock, enter a combination of 00000.

Example: Desired combination = 12345. With the printer offline, proceed as follows:

Menu



Enter



8

Menu



Enter

LCD says **Prog : Exit**

LCD says **Prog : PrMenu**

Main menu is printed.

↓  9	Press 9, 8, ENTER to print the security menu.
↑  8	
Menu	
	
Enter	
Font	
 2	Press 2, ENTER to select Online Key Lock.
Menu	
	
Enter	
1, 2, 3, 4, 5	Enter combination for Online Lock.
Menu	
	
Enter	New combination for Online Lock is 12345
Clear	
	
First	Main Menu is printed
Park / Path	
 1	Exit the Main Menu
Menu	
	
Enter	LCD says PrMenu:
Font	
 1	Save
Menu	
	
Enter	LCD says Prog : PrMenu
Clear	
	
First	Exit the printed menu



LCD shows format number.

If the printer is turned offline, then online, lights flash and a prompt to enter the combination is displayed. Press ENTER following the last digit (1, 2, 3, 4, 5, Enter).

The Online Lock may be set from the host by sending an escape sequence. Details are in the ANSI chapter in the *Programmer's Manual*.

If the printer is locked online and the combination is unknown, send the escape sequence to either set the combination to 00000 (which removes the lock) or to another number. Send the escape sequence to select ANSI before sending the escape sequence to change the lock to be sure the printer is in ANSI emulation.

If all else fails, remove the lock with an ISU; see "Reset the Printer – ISU", Chapter 9. Be sure to have a printed configuration sheet available if an ISU is performed. An ISU erases all configuration information. It is recommended that a status report be printed if the printer is to be locked online or any time the configuration is changed.

Lock the Printed Menu

The printer can be set so that the printed menu will not work until a combination of digits is entered. Setting the combination is very similar to setting the combination for the online lock described in the previous section. As many as 5 digits can be entered (the highest useable number is 65535) or enter 00000 to remove the lock. This can be done from the Security menu, (option 98 on the main printed menu) or from the host by sending an ANSI escape sequence. Details are in the ANSI chapter in the *Programmer's Manual*.

Recovery from a lost combination is the same as for the online lock; the best method is to send down a 00000 combination from the host. If an ISU is necessary, print out a status sheet before resetting the printer.

Lock Various Keys

The security menu allows certain keys to work online or offline. The process is self-explanatory upon entering the security menu.

Chapter 6. Formats

What Is A Format ?

A format is a set of operating parameters, which are stored in nonvolatile RAM. There are four stored formats and one active format. All formats contain the following operating parameters:

Font	Modes	Top Print Reference
Character Set	Form Length	Horizontal Tabs
CPI	Top Margin	Vertical Tabs
LPI	Left Margin	Left Print Reference

Each paper path has a stored format assigned to it. The same format can be assigned to more than one paper path. Any format can be modified and renamed.

Why Use Formats?

Normally the printing parameters of the printer are controlled by the host, usually via the application.

NOTE: If the printer can be changed from the application, it is not usually necessary to modify format parameters.

Formats are very useful, however, when the host application cannot change the printer's operating parameters. In those instances, using formats is advisable if parameters need to be changed often, such as to print on a variety of forms.

The Active Format

The active format is a series of operating parameters, which the printer currently uses when printing. As shipped, or upon an ISU of the printer, factory default parameters plus all the parameters of Format 4 become the active format. From this point on, any number of changes to the active format can be made. Events that can change the active format are:

- commands from the host
- LCD menu changes
- printed menu changes
- control panel keys (CPI, LPI, etc.)
- selection of an alternative format
- selection of a different paper path

Stored Formats

A stored format is a series of operating parameters held in the memory of the printer. This printer has four individual stored formats. Any one of these formats can become the active format. As shipped, or upon an ISU of the printer, the four stored formats are set or revert to factory default parameters. From this point on, any number of changes to the four stored formats can be made.

Print All Format Information

Complete information about all formats can be printed using the LCD menu. To print all format information, select **Prog : Utility** from the main menu. The first two selections under this submenu **Prnt:Stat** and **PR Format** will print all information about all formats. It is always a good idea to keep a current copy of the status and formats printout for future reference.

Formats Auto-execute on Paper Path Change

As shipped, when the paper path is changed, the printer will set the active format to the stored format that is assigned to the new paper path. If the previous active format has not been saved to a stored format, all settings in the previous active format are lost.

This function can be disabled in the printed menu. Under the main menu selection *User Defined Options, disable Forms Parameters Change on Paper Path Change*.

Change a Format - Printed Menu

From the printed menu:

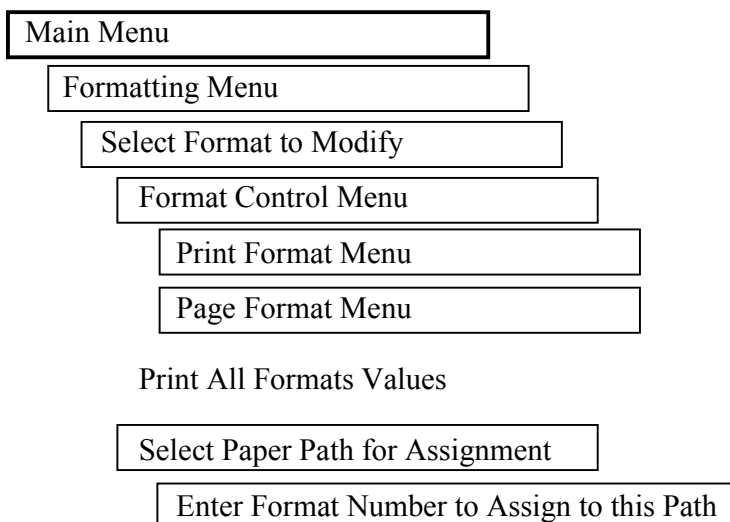
The active format and the four stored formats can be modified directly. Changes to a stored format will not affect the active format.

All formats values can be printed.

Assignment of paper paths to formats can be made.

See Chapter 4, "Access the Printed Menu" and "Printed Menu Map" for a review of this procedure.

From the main LCD menu select **Menu :PrMenu**. In the main printed menu select **2. Format**.



Save a Format from the Control Panel

The active format, along with any changes made, may be saved to any one of the stored formats with the Save option on the LCD menu.

Note: The format number that displays first when saving is the currently assigned format.

Select the desired format by using the UP or DOWN arrows. Press ENTER to save.

Save a Format from the Host

The active format may be saved to any of the stored formats with an ANSI escape sequence. The ANSI term for this is CSS (Customer Setup Save). The printer must be in ANSI emulation to do this. (Emulations can be switched with escape sequences. Details are in the ANSI chapter in the *Programmer's Manual*.)

Select a Format from the Control Panel

A stored format can be changed to the active format using the ForniAT key on the control panel. With the printer offline, press and release the FORMAT key to cycle through the formats: ACTIVE, 1, 2, 3,4. Stop at the desired selection and wait about three seconds for the function to time out. The selected format overwrites the active format and is assigned to the current paper path.

Selecting ACTIVE will exit the format function without changes.

Select a Format from the Host

A stored format may be selected from the host with an ANSI escape sequence. The ANSI term for this is CSU (Customer Setup Unsave). The printer must be in ANSI emulation to do this. (Emulations can be switched with escape sequences. Details are in the ANSI chapter in the *Programmer's Manual*.)

Select the Assigned Format from the Host

The format assigned to the current paper path may be selected with an ANSI escape sequence. The ANSI term for this is RIS (Restore to Initial State). The printer must be in ANSI emulation to do this. (Emulations can be switched with escape sequences. Details are in the ANSI chapter in the *Programmer's Manual*.)

Power Up to the Currently Assigned Format

As shipped, the printer will power up with the setting that was in the active format when power was turned off. The printer may be set to power up with the format assigned to the current paper path. This can be done in the printed menu Software Option 14. See Chapter 4.

Rename a Format

As shipped, the printer will power up with the setting that was in the active format when power was turned off. The printer may be set to power up with the format assigned to the current paper path. This can be done in the printed menu Software Option 14. See Chapter 4.

An alphanumeric name of up to 16 characters can be assigned to each of the four stored formats and also to the active format. This can only be done from the host using ANSI escape sequences. See the ANSI chapter of the *Programmer's Manual*.

The stored format names are saved in nonvolatile RAM until changed by the user or reset by ISU.

Note: A user-defined name for the active format will be lost when a stored format is called up.

LCD Message Display

A one-time message to be displayed on the printer's LCD can be downloaded. This will be overwritten by the next action that would otherwise update the display.

The printer must be in ANSI emulation to download format names and messages. (Emulations can be switched using escape sequences. Details are in the ANSI chapter of the *Programmer's Manual*.)

Linking Emulations to Formats

When the printer is shipped, and again at ISU, none of the stored formats is linked to an emulation. In the ISU condition of the printer, the current emulation remains current when a stored format is invoked. This is true whether the stored format is invoked by a paper-path change, by the control panel Format key, or by ANSI CSU command.

Any supported emulation can be assigned (linked) to any of stored formats 1-4. The only way that a linkage can be either assigned or modified is via the printed menu. A linkage thus established is the *only* stored parameter that is immune from being overwritten if the current state of the printer is saved to the affected format. This is true whether the current state is saved by the SAVE function on the LCD menu, or by ANSI CSS command.

Chapter 7. LCD Head Gap Menu

The print head gap may be controlled from the LCD menu. Print head gap is the distance from the print head nozzle to the striker bar. Maintaining the correct print head gap is critical to good print quality and print head life. If the gap is too small, characters will smudge and the ribbon may snag on the print wires. If the gap is too large, the print quality will be poor, the printer will be noisier, and print head wear speeds up.

As shipped, the printer is set to automatically adjust the print head gap each time a form is loaded.

Semiautomatic head gap adjustment allows preset print head gaps to be applied to any paper path.

Semiautomatic head gap adjustment may be used in one paper path and automatic print head gap adjustment used in another.

From the LCD main menu **Prog : Utility**, select **Utility:Prnt Stat** to print a status that shows the print head gap mode and offset settings for the active format. Select **Utilit:PR Format** to print the same information for the four stored formats.

Print head gap control is available only from the LCD menu. Neither host commands nor the printed menu offer any control over the print head gap.

Change Ribbon

From the LCD main menu **Prog : Head Gap**, select **Head G:Ribbn Chg** to open the print gap for removing and installing a ribbon.

Because the print head gap is opened whenever paper is parked, it may be more convenient to park the paper when removing and installing a ribbon.

Pros and Cons of Auto Head Gap Adjust

The advantage of auto head gap is that the operator never needs to adjust the print head gap, except perhaps as the ribbon wears. Forms of various thicknesses may be loaded into the different paper paths and the print head gap will be adjusted to match the form.

The disadvantage of auto head gap is that the printer makes a mark on the first form when it senses the thickness. This may be a problem when using preprinted, prenumbered forms (such as payroll checks), or if paper paths are changed frequently.

How Auto Head Gap Adjust Works

When set to Auto Head Cap Adjust (as shipped), loading a paper path will cause the following actions:

Any time there is no paper under the print head, the print head will back away from the striker bar as far as possible.

Pressing the FF / Load key will load paper in the selected path to the top print reference.

The carriage moves the print head to a position over the paper-out sensor.

The print head moves in and presses with a known force against the ribbon to establish the thickness of the ribbon / paper combination.

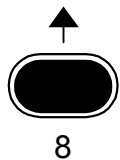
The print head moves back a certain distance and then forward again for half that distance. This minimizes the effects or mechanical backlash on the accuracy of the adjustment.

Change the Auto Head Gap Adjustment

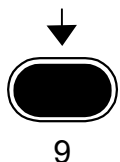
If the print head gap is consistently too tight or loose, or as the ribbon wears, printing becomes lighter, the print head gap offset may be adjusted from the LCD menu. To make adjustments to the print gap use the following procedure:



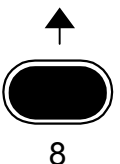
Make sure the printer is in local mode (the On Line light is off). Press the MENU Key. The LCD will display **EXIT**.



Press the UP arrow until **Head Gap** is displayed. Press the ENTER key, **Ribbon Chg** will be displayed.



Press the DOWN arrow until **Automatic** is displayed. Press the ENTER key, **Gap Adj** will blink and **Automa> XX** will be displayed, where **XX** number will be between 1 and 20.



If printing is too light, decrease the number by using the UP arrow key. If printing is smearing, increase the number by using the DOWN arrow key. Make the change in small increments.



To test the new setting, press the PRINT QUALITY key, **Test * Running** will be displayed and the printer will start printing a test pattern. To stop the printing, press the PRINT QUALITY key again (a few lines will print before the printer stops printing). To view the printing, press the TEAROFF key, **Tearoff** will be displayed. If the print gap still needs adjusting, press the TEAROFF key again, the UP or DOWN arrow key and test it again.



To save the change, press the ENTER key, the display will blink with **Gap Adj** and stop with **Automatic**. Press the CLEAR key, **Exit** will display. Press the DOWN arrow key to Save. Press the ENTER key twice, Format X, where X is 1 to 4 will blink and the new setting has been saved to the specified format.



Press the CLEAR key, **Exit** will be displayed. Press the ENTER key to exit the Program Mode.

Finish by tearing off the excess paper, parking the paper, reload the paper and send a test to the printer. If satisfactory, the adjustment is complete. If not, repeat this section to adjust the print gap further.

Before Saving to a Format

If anything other than print head gap settings is to be saved, the printed menu offers the best approach.

Print head gap settings may only be changed from the LCD menu. The only way to save print head gap settings to one of the stored formats is to modify the active format and save it to the desired stored format.

With paper loaded in the desired paper path, note carefully the format number shown on the LCD. This is the format assigned to the current paper path. Press and release the FORMAT key to select the desired format. Print head gap settings may now be made.

Save the Setting to a Format

Press the FIRST key to go back to the LCD main menu. Use the DOWN ARROW to step to **Prog:Save**. The format assigned to the current paper path will be shown on the LCD. Press the ENTER key to save the current state of the printer to the number shown on the LCD.

As in the case of other user-adjustable parameters, changes to the head gap settings apply initially to the active format. The active format is normally maintained through power on and power off, but will be overwritten if the paper path is changed or if a different format is loaded by the control panel or the host.

Semiautomatic Head Gap Adjust

To avoid a mark on the first form each time a paper path is loaded, select semiautomatic head gap adjust for that paper path. Different fixed gap settings may be assigned to any of the paper paths.

With paper loaded in the desired paper path, note carefully the format number shown on the LCD. This is the format assigned to the current paper path. Press and release the Format key to select the desired format. Print head gap settings may now be made.

From the LCD main menu **Prog : Head Gap**, select **Head G:Semi-Auto**. The numbers in this menu are backwards from the numbers in the Auto Head Gap Offset menu. In semiauto head gap adjust, the smaller the number, the larger the print head gap.

Pressing the UP ARROW or DOWN ARROW keys repeatedly will scroll through a list of settings that include selections for 5-part, 6-part etc. These are good starting points for various multipart forms.

Press the PRINT QUALITY key to start a test pattern. Press the key again to stop the test. Press the TEAR OFF key to view the printout.

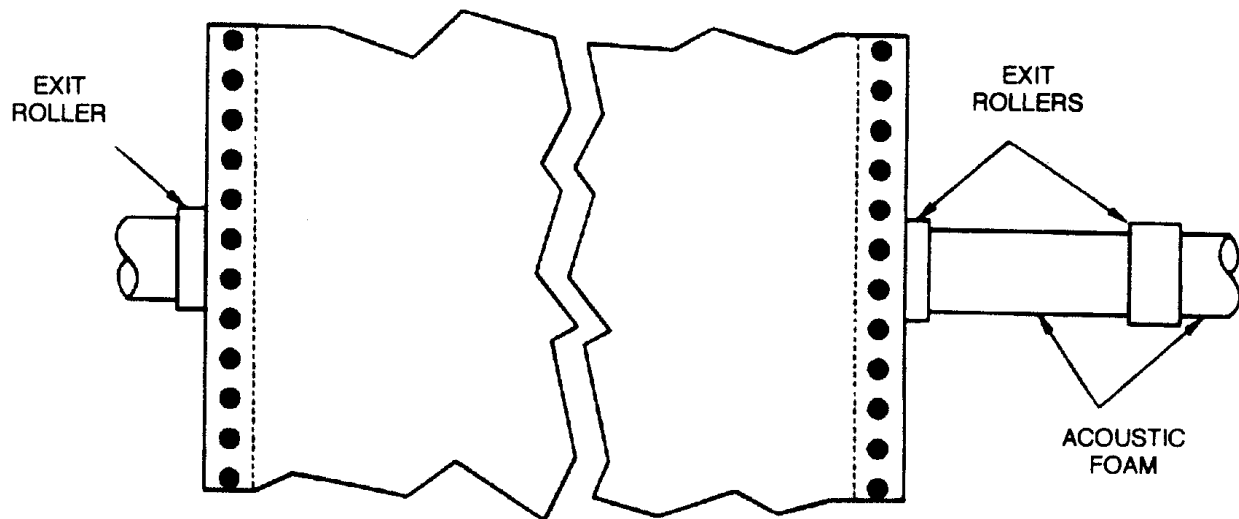
Make small adjustments until optimum print quality is obtained.

To save the changes to the form assigned to the current paper path, select **Prog : Save** from the main LCD menu and press Enter.

Chapter 8. Line Up the Job on the Page

The UP ARROW and DOWN ARROW keys work like a paper advance knob. Instead of adjusting top-of-form this way every time paper is loaded for a particular job, the required offset can be stored as a top print reference.

Note: For common paper sizes, the horizontal print position can be adjusted by moving the tractors on this printer. However, if the edges of the paper don't engage the exit rollers, the paper won't feed properly. This results in skewed lines or paper jams. If necessary, pull the left tractor locking lever forward and adjust the left tractor position so that the left edge of the paper lines up with "0" on the position guide behind the tractor.



Vertical Paper Movement

If the vertical position of a line of text isn't exactly where it should be on the paper, the form can be moved up or down in 1/72-inch increments with the UP ARROW and DOWN ARROW keys. Hold a key down to move the paper faster. It is possible to move paper with the arrow keys even when the printer is online.

Positioning paper with the arrow keys is the same as turning a paper advance knob; it is what is known as an "unregistered move." The printer does not keep a record of how far the paper was moved, and any adjustment made this way disappears when paper is reloaded. The next time the paper is loaded, the printer advances paper so that

the top edge of the physical form lines up with the top wire of the print head. The distance that paper moves during a load operation is the “load-length distance”.

What is a Print Reference?

The top print reference is similar to a top margin, and the left print reference is similar to a left margin. However, there are critical differences between margins and print references that should be understood before deciding which one to set.

Set a Top Print Reference

Assume that a particular form must be adjusted the same number of increments with the UP ARROW key every time that form is loaded. This step may be eliminated by saving an offset value to the load length distance so the form will automatically be properly positioned when it is loaded. This is the Format parameter "Top Print Reference."

Top print reference can be set from the LCD menu, or from the printed menu. It is easier to set it from the printed menu.

Different top print references can be included in stored formats, but there are two aspects of setting the top print reference that are not obvious:

1. The top print reference *cannot* be modified in the active format. If a top print reference is not saved to a stored format, it never takes effect.
2. After saving a top print reference to a stored format, it will not take effect until the next time paper is loaded. If a top print reference is saved to a stored format, the operator must park and reload the paper in order for the top print reference to take effect.

There must always be blank space at the bottom of a form that is equal to or greater than the top print reference; otherwise, the printer will print across the perforation and onto the next form.

If a non-zero value is set for the top print reference, the tear-off distance in the affected format may need to be changed accordingly (see next section).

Set the Tear Off Distance

1. Park and reload paper so the top print reference, if set, will take effect.
2. With paper at top-of-form, press the TEAR OFF key. The printer advances paper according to the current tear-off distance.
3. Use the UP ARROW and DOWN ARROW keys to set the desired tear-off distance.
4. Press ENTER.
5. Press the TEAR OFF key again, or wait for the tear-off function to time out.

The new tear-off distance is now stored in the currently selected format.

Set a Left Print Reference

A left print reference can be set either from the print reference option on the LCD menu or from the printed menu. The menus expect values to be entered in inches and hundredths (unless the units of measure have been changed to decipoints via software options on the printed menu).

In contrast to the top print reference, the left print reference can be modified in the active format. Different left print references can be saved in each of the four stored formats.

CAUTION

Do not set a left print reference that will cause printing off the right side of paper. This will damage the printer.

Local Margins are Tricky

It is a good idea to set a right margin equal to the form width. If the host gets confused and sends a long line of data, it is not desirable to print off the right-hand edge of the paper.

All of the emulations have control sequences to set both horizontal and vertical margins, but very few printer drivers use them. Typically, an application assumes that no margins are set at the printer and sends spaces and line feeds to effect the horizontal and vertical margins specified. Some applications clear all printer margins before sending any printable data.

If a margin is desired and it can be set from the application, set it from the application. If either horizontal or vertical margins are set locally to position a job on the page or to skip over perforations, they may work with one application and not with the next.

Use Top Print Reference or Top Margin?

The selection of a top print reference or a top margin depends upon the methods that the application uses for paper movement. A top print reference is used when printing needs to start in a different location than where the paper is initially loaded. A top margin also adds space to the top of a print job, but it may have a different effect, depending upon the method used for moving paper to the top of the next form.

Many applications don't send form feeds to move from one form to the next, but instead they send enough line feeds to get from the last printed line on one form to the first printed line on the next.

If a top margin is set at the printer and the application is sending *form feeds* to move from one form to the next, the top margin will work as expected. If the application is sending *line feeds* to move from one form to the next, however, the top margin will accumulate. The first printed line on each successive form will move down the page by the amount of the top margin.

To summarize, a top margin adds blank space beyond what is sent by the host. A top print reference, on the other hand, adds no blank space but simply moves printing down on the form.

Use Left Print Reference or Left Margin?

Setting a non-zero value for the left print reference moves printing to the right on the paper.

When deciding whether to set a left margin or a left print reference, note that if a left margin is set at the printer and the application sends horizontal tabs, the position of the horizontal tabs relative to the leftmost character on the paper may no longer be correct. This depends on how the application sets tabs and whether horizontal tabs were set before or after the left margin was set.

To summarize: if it is desired to limit the number of characters that can be placed on a line, then use left and right margins. If the horizontal position of printing on the paper needs to be changed, use the left print reference.

Load Length Adjustment

Load length is the distance that a form is advanced beyond the point of actuation of the paper-out switch when that form is loaded following an ISU. The load length adjustment is correct when, following an ISU, the absolute top edge of the form is loaded aligned with the topmost print wire on the print head.

The load length adjustment is carefully set at the factory and should not need to be changed unless a user has inadvertently changed the setting during an ISU, or the paper-out switch has been replaced. If the load length adjustment is high, printing on the striker bar may occur during a low-paper condition. If low, the printer may print on the striker bar above the first line of the first form. An error in either direction compromises the accuracy of any vertical settings relative to the absolute top edge of the form.

The following procedure requires that the ISU be performed twice. This is not a mistake; it is the most straightforward way to make sure any print references or vertical margins get cleared. It is important that the load length adjustment be performed as described below. *DO NOT* use the load length adjustment to establish any top margin, however small.

1. Turn printer power off.
2. Press and hold the control panel keys numbered 1 and 2.

3. While holding keys 1 and 2, turn the printer power on. Continue to hold until the printer powers up with the FAULT light flashing.
4. Release keys 1 and 2.
5. Press the CLEAR key to acknowledge the ISU.
6. With the printer offline, press the PARK key to park paper in the current path; then press the FF/ LOAD key to reload it. This positions the absolute top-of-form according to the load length adjustment.
7. Press the CLEAR key.
8. The topmost print wire on the print head should be positioned just below the absolute top edge of the form. This can be verified by printing a line of test pattern as described in "Print a Test Pattern", Chapter 2, or by sending a line of data from the host. The topmost printed dot should be entirely on the form but no more than 1/32 inch below the absolute top edge of the form. If this is true, no adjustment is necessary. If not true, then proceed as follows:
9. Park paper and reload it.
10. Turn printer power off.
11. Press and hold the control panel keys numbered 1 and 2.
12. While holding keys 1 and 2, turn the printer power on. Continue to hold until the printer powers up with the FAULT light flashing.
13. Release keys 1 and 2.
14. While the FAULT light is flashing, use the UP- and DOWN-ARROW keys to align the absolute top edge of the form with the topmost wire on the print head.
15. Press the CLEAR key to acknowledge the ISU.

Chapter 9. Power Up and Reset

This printer stores user-adjustable parameters, from print quality to bar code expansions, in an area of nonvolatile RAM known as the active format.

The State of the Printer on Power-up

When the printer is shipped, it is configured so that it powers up to the active format. In other words, every time the printer is turned on, it has the same settings as when it was last turned off. If the last thing that was printed before turning power off was at 12 CPI and 4 LPI, when the printer is turned back on, it prints at 12 CPI and 4 LPI until the user or the host tells it otherwise.

As an alternative, if it is desired that the printer power up to the settings in the currently selected format, go to the printed menu and set Software Option 14 to ENB.

Reset the Printer - ISU

The printer can be set to the way it was when it left the factory by performing a procedure known as an "ISU." When the printer is shipped, the emulation is set to ANSI. Print parameters are set to emulation-defined defaults. Interface controls and other print-engine specific parameters are set to generic values. These factory settings are the Initial SetUp, and the procedure that restores these settings is an "ISU." If the ISU is performed on the printer, then nearly every adjustable parameter stored in nonvolatile RAM is replaced with default values from ROM.

An ISU is somewhat analogous to rebooting a computer. If the printer seems to be locked up and recycling power doesn't free it, try an ISU.

An ISU can cost some work if complex setups are stored in the printer. The stored formats and format-to-paper-path assignments are reset to factory settings along with nearly everything else. If possible, before performing an ISU, print a status sheet and a format sheet. To perform an ISU:

1. With paper loaded in the current path, turn the printer power off.
2. Press and hold the PARK/ PATH and FONT keys (1 and 2).

3. While holding these two keys, turn the printer power on. Continue to hold the keys down until the printer turns on with the FAULT light flashing.
4. Release the PARK/ PATH and FONT keys. *Do not* press the UP ARROW or DOWN ARROW keys at this time.
5. Press the CLEAR key to acknowledge the ISU. The FAULT light stops flashing and, in the absence of any printer faults, goes out.

After a Software Upgrade

Note: Be sure to ISU the printer if any ROMs are changed or the PHPM board is removed and reinstalled. If this is not done the printer may lock up.

After an ISU

The following items may need to be restored after an ISU:

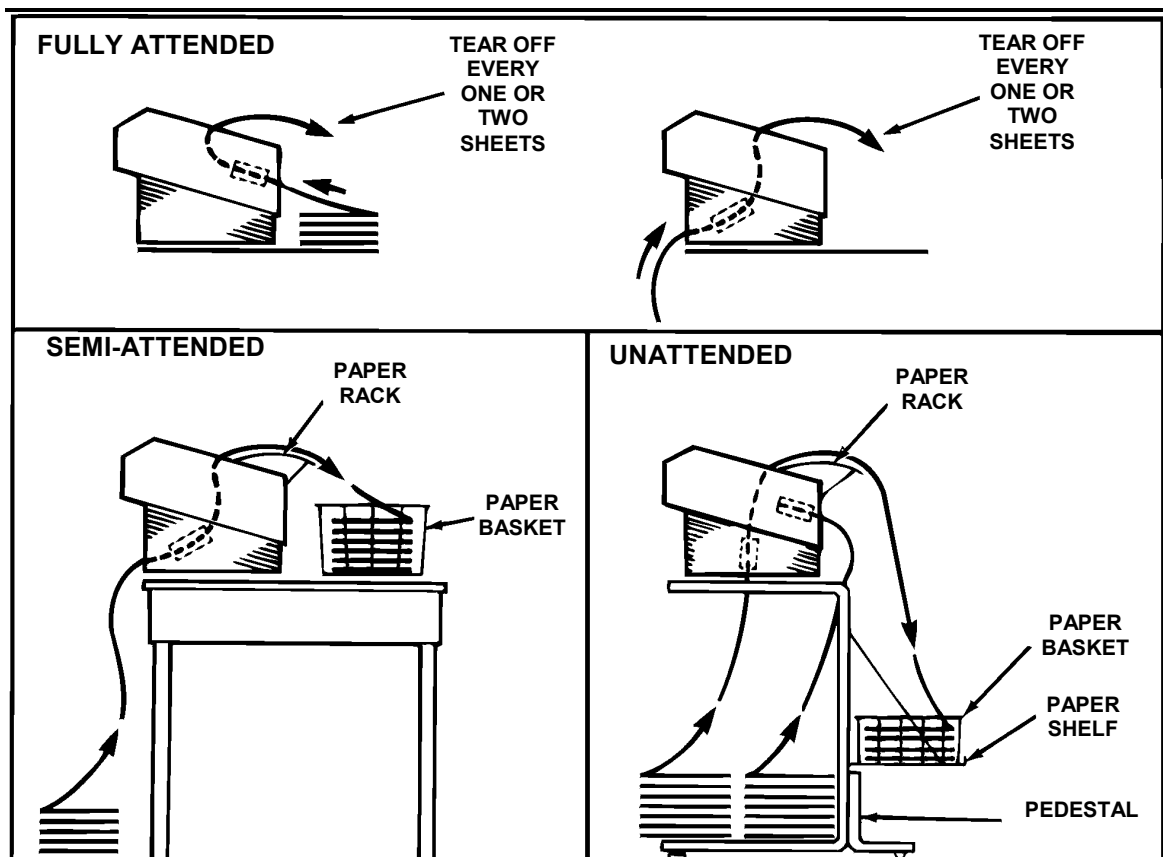
1. Any option that is enabled from the hardware options menu (item 99 on the main printed menu).
2. The emulation if using anything but the defaults.
3. Any straps that have been modified (software options or emulation-dependent options).
4. Formats 1-4 may need to be programmed.

Note: User parameters that are not reset are the flight-time compensation adjustment (see "Adjust the Flight-Time Compensation", Chapter 11) and the load length adjustment (see Chapter 8).

Chapter 10. Paper Handling Features and Techniques

Use the bottom paper path for thick, or heavy, hard-to-feed forms. Use the rear path for forms that are easiest to feed.

The part numbers for the pedestal, rack, and basket shown below are in “Options and Supplies”, Appendix C.



Paper Handling Configurations

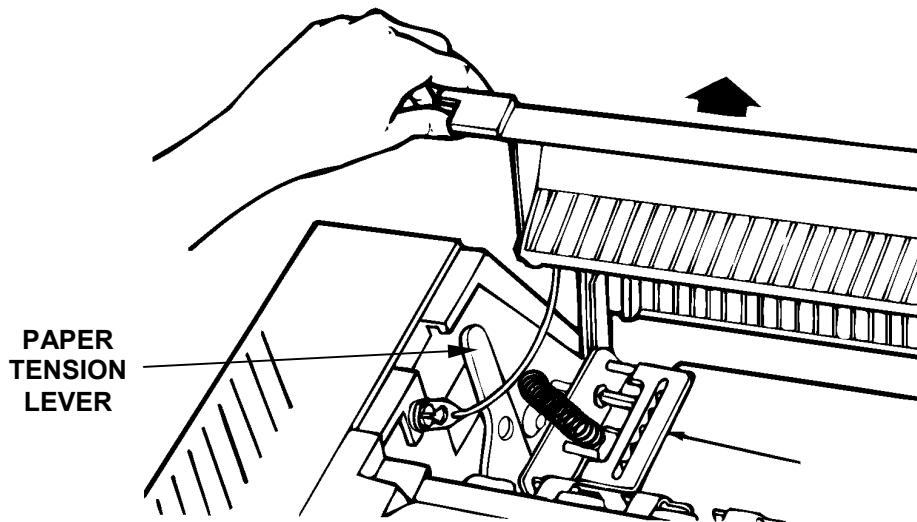
Adjust Paper Tension

The printer is shipped with the paper tension set to the middle setting. This works for most continuous forms. The paper tension may need to be adjusted for:

- multipart forms
- heavy paper or card stock
- the manual paper path

Adjusting paper tension changes the tension between the main friction roller and the nip roller assembly. This adjustment affects the rear and manual paper paths, but not the front path.

Low paper tension will cause inconsistent line feeds. High Paper tension will eventually cause the sprocket feed holes to tear out. Paper tension and print head gap settings may interact. Try different settings to find the combination that works best.



Check the Chart

The chart shows starting points for the paper tension adjustment. A higher number increases the tension; moving the lever toward the rear of the printer.

Open the rear door

Pull the paper tension adjust level away from the side frame ...

To disengage the lever pin from the hole in the side frame.

Move the lever to the new position.

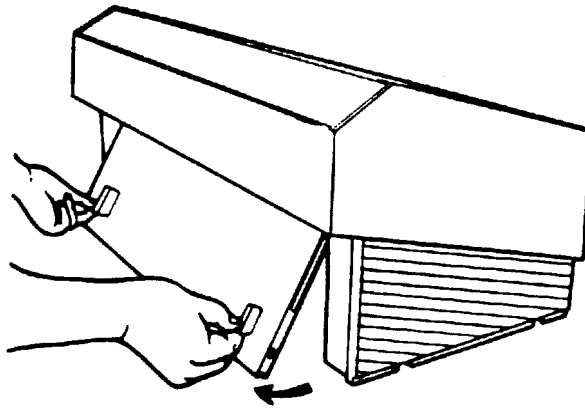
Make sure the level pin is in one of the four holes that serve as detents.

Lever Position	Type of Paper
1. (toward the front of the printer)	Use as needed.
2. (middle position)	Continuous feed: 15-24lb. Manual feed: light weight cut sheets
3. (toward the rear of the printer)	Manual feed: envelopes, heavy cut sheets

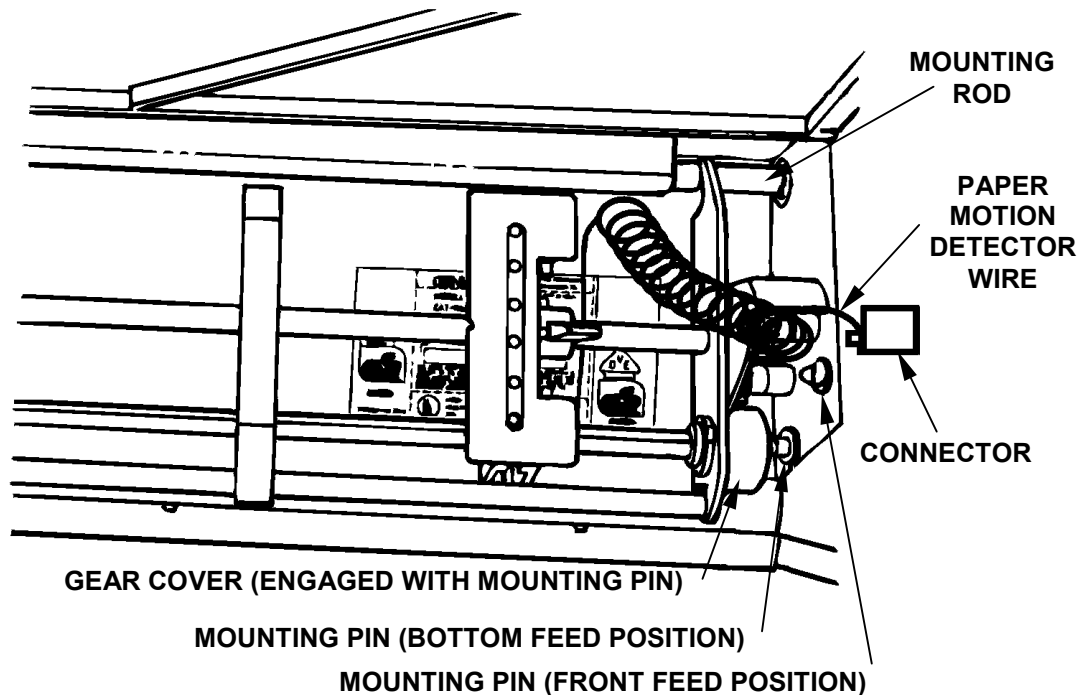
Install the Front Tractors

The printer is shipped with one set of tractors installed in the rear, and a second set boxed separately for installation in the bottom / front paper path.

*At the front of the printer,
pull the front cover open
and slide it into the
storage position.*



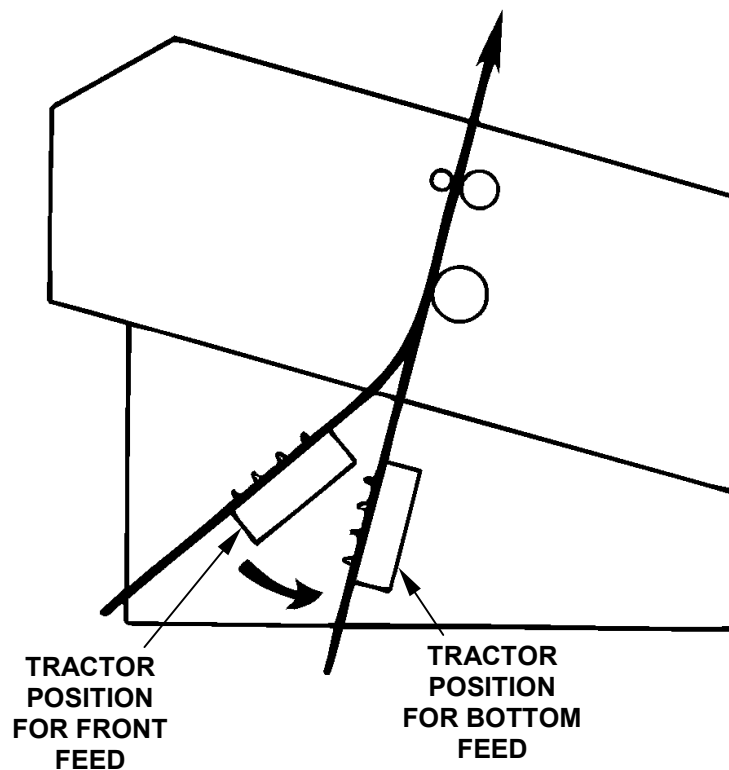
*Hook the notch on each
slide of the tractor set
over the mounting rod in
the front of the the
printer.*



NOTE: Install the paper motion detector wire into the connector on the right side frame.

Press the tractor set down and into the printer until it snaps into place in the front feed position, or push it farther into the printer until it snaps into the bottom feed position.

The tractor is snapped in place when the hole in the gear cover on the tractor set engages one of the mounting pins in the printer.



Tractor Position for Front and Bottom Feed

Switch Between Front Feed and Bottom Feed

The tractors may be easily switched between front and bottom feed. The tractor assembly swings from hooks at the top.

*At the front of the printer,
pull the bottom of the
acoustic door outward
and slide the top inward
into the storage position.*

Find the gear covers.

The bottom tractor shaft is square with a gear cover on each end. Spring-loaded balls in each gear cover engage locating pins in the sides of the printer.

*Front feed to bottom
feed*

Push down firmly on the square shaft near the ends. The assembly will pop free of the locating pins. Swing the assembly down until it snaps into the locating pins for bottom feed. Wiggle the ends of the assembly to ensure the pins are engaged.

Bottom feed to front feed

Pull up firmly on the square shaft near the ends. The assembly will pop free of the locating pins. Swing the assembly up until it snaps into the locating pins for front feed. Wiggle the ends of the assembly to make sure the pins are engaged.

Removing the Rear Tractors

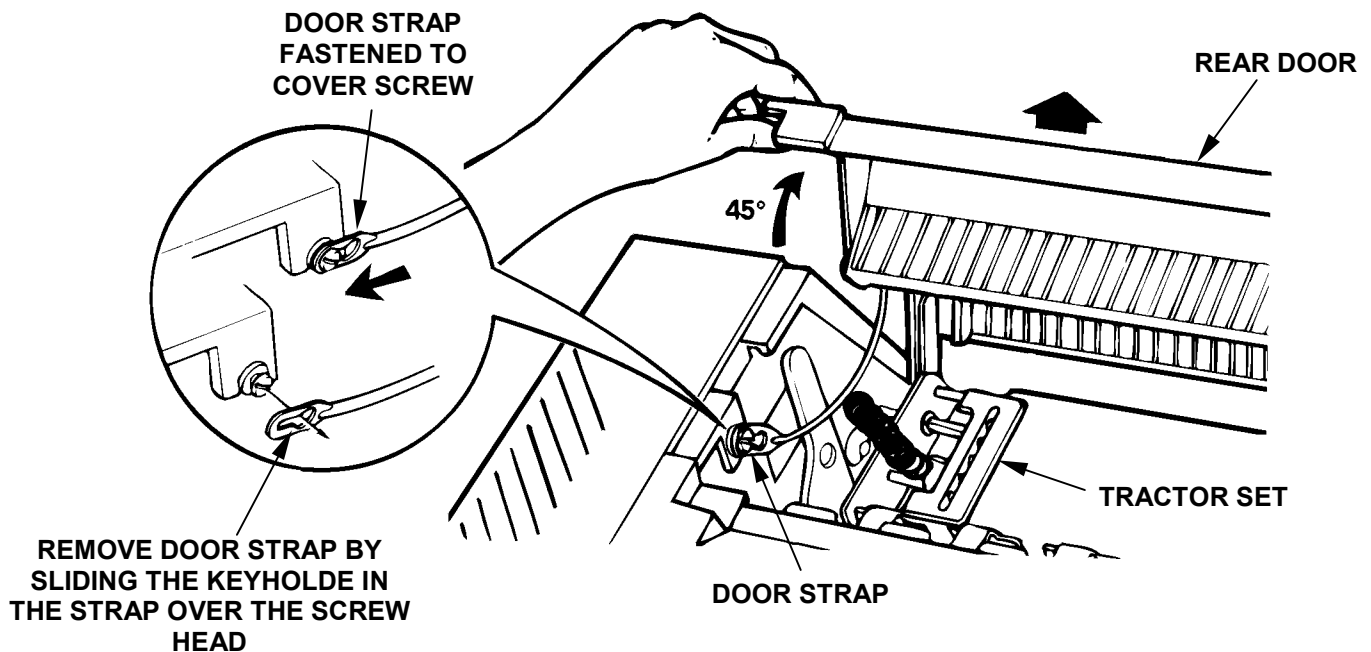
The tractors installed in the rear of the printer are interchangeable with the tractors for the bottom/front paper path. If the need arises to move the rear tractors to the front, follow this procedure to remove the rear tractors.

Remove the retaining straps on the rear door.

The nylon straps are keyed to slide over the screws.

Remove the rear door.

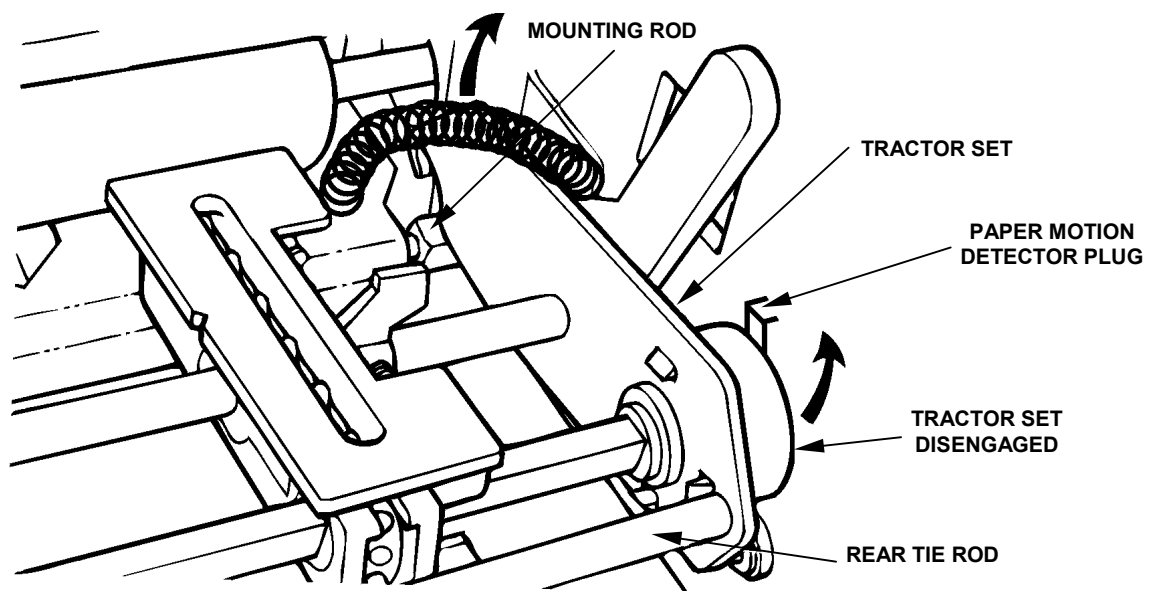
Open it part way then lift it up.



Remove the Rear Door

Remove the paper motion detector plug (RJ 45) from the right side frame.

Reach inside the printer and grasp the tractor set by the rear tie rod.



Remove the Tractor Set from the Rear Path

Lift up on the rear tie rod until the tractor set snaps free of the end supports.

Move the tractor set forward to unhook it from the mounting rod.

Reinstall the rear door.

Change Paper Paths from the Control Panel

Tear off any forms in the current path.

The printer will retract up to one and one half times the form length or six inches whichever is greater.

Park / Path



The printer parks the form in the current paper path.

Press and release the Park/Path key until the LCD shows the desired paper path.

Wait three seconds for the function to time out.

Fault : Paper Out

FF / Load



If there is paper in the selected path, the printer will load a form.

If the LCD still says Fault:Paper Out.

If a form is loaded, press the Clear key. As shipped, the printer will clear a paper out fault when a form is loaded. If software option 13 is disabled, the fault must be cleared from the control panel.

Change Paper Paths from the Host

Front or rear paper paths may be selected from the host. The printer must be in ANSI emulation to do this. Emulations may be switched using escape sequences. Details are in the *Programmer's Manual*.

If the paper shear option is not being used, forms may need to be torn off before the host can make a paper path change. To insure that this happens:

- Send a form feed before sending a command to change paper paths.
- Put a pause in the program and a prompt to tear off paper.
- In the printed menu, if auto tear off is selected under printing modes in the format menu, the paper will advance to the tear off position after a form feed.
- In the printed menu, set user defined option Paper Tearoff Timeout to disabled. This causes the printer to go busy while paper is in the tearoff position. This will make sure that the current form gets torn off before a remote paper path change can be made.

When the paper path is changed from the host, the printer will park paper in the current path by retracting six inches of paper or one half of the current form length, whichever ever is greater. This contrasts to the one and one-half form lengths that will be parked from the control panel.

If more paper than this remains, the printer will cancel the paper park and move the paper back to its original position. No more data will be printed and both the control panel and interface will indicate a fault condition.

Recover from a Remote Path Change Failure

If the printer cannot change paper paths because there is too much paper in the current path to park, the LCD will indicate a paper jam. To recover, press the Tear Off key and tear off the form in the current path.

Press Park/ Path to load the new path and print any data sent to the new paper path.

Auto Load on Paper Out

The printer may be set so that when paper runs out in the front/bottom or rear paper paths, it will automatically load paper from the other paper path. Both sets of tractors must be installed to do this.

This feature is controlled by *Two Box Option, Auto-load of Continuous Forms* under *User Defined Options* on the printed menu. The printer is shipped with this option disabled.

Multipart Forms

When printing multipart forms:

Use the bottom paper path for very thick or heavy forms. When printing on different weight forms, use the rear paper path for the lighter forms.

If multipart forms are to be printed from the rear path, make sure the paper is pulled as tight between the tractors as possible without causing the holes to tear out.

Check the paper tension adjust lever for the correct setting; see “Adjust Paper Tension” in this Chapter.

Select either the WD Gothic DP or the WD Gothic LQ font. The WD (wide) fonts make better carbon copies. Fonts can be selected directly with the font key, from the LCD menu, or from the printed menu.

Select MultiPart to reduce carriage speed and increase print impact. From the **Prog:SpcMod** LCD submenu, select **SpcMod:MultiPart**. From the printed menu, go through the *Format* menu to the *Printing Mode* submenu and select *Multi part forms mode (increased impact)*. Select MultiPart mode downline via the Straps and Options escape sequence, store it in a format, and recall the format with an escape sequence. See the ANSI chapter in the *Programmer's Manual* for details.

As shipped, the printer is set to move paper at 15 inches per second. If the printer is tearing the sprocket holes, or otherwise pulling forms apart during form feeds, reduce the paper speed to 5 inches per second. On the printed menu, go through the *Format* menu to the *Select Printing Mode* submenu. Like Multipart Mode, this option can be selected downline via the Straps and Options escape sequence.

Manual Paper Path

Cut sheets and envelopes may be printed one at a time using the manual paper path. The manual paper path guides snap onto the front part of the rear cover allowing easy loading of cut sheets and envelopes.

When printing cut sheets, allow at least a 1/6-inch margin at the top and a 1/2-inch margin at the bottom of the page. Printing closer than 1/2 inch to the bottom of the page, will cause a paper-out fault. At 6 LPI, a paper-out fault will occur after the 64th line.

For this reason, sending line feeds to advance paper to the next form will not work with cut sheets in the manual paper path.

Also, printing on the very top of a cut sheet may cause inconsistent print quality on the first line of the form.

To use the manual paper path:

With the printer offline,

Park / Path



Press Park/Path the currently loaded form.

Park / Path



Press and release Park/Path until **Path : Manual** appears in the LCD.

Path : Manual

Set the paper tension adjustment to 2.

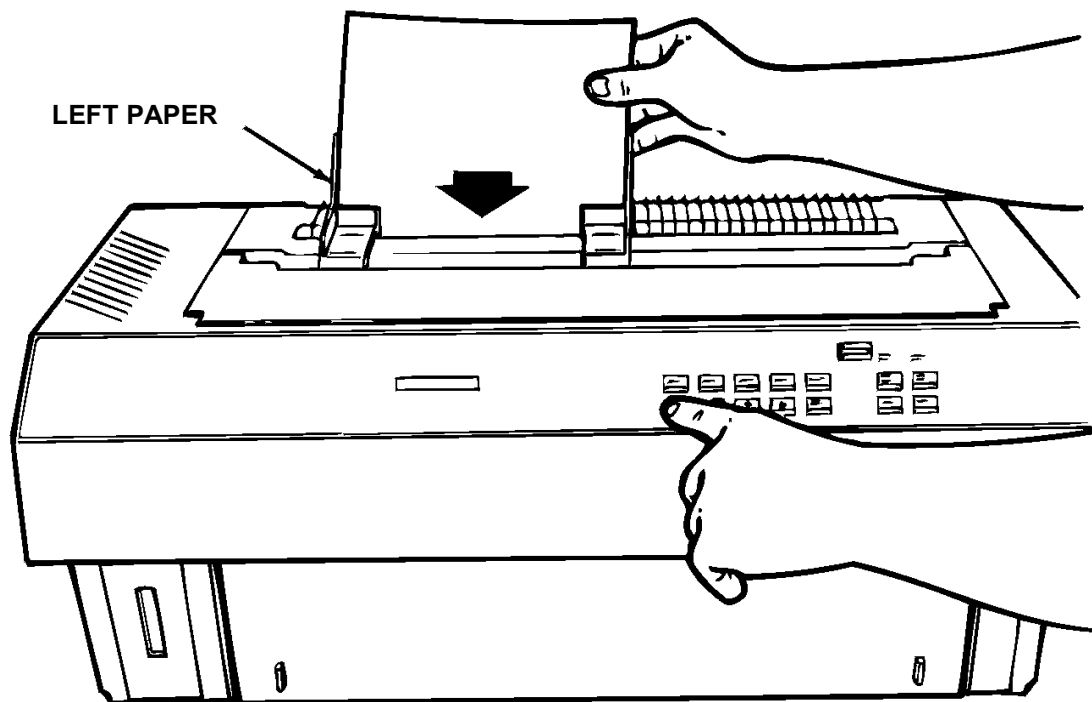
See “Adjust Paper Tension” earlier in this chapter.

Adjust the paper guides for width and position.

If the printer is set for 0 left margin and 0 left print reference, lining up the arrow on the left paper guide with the arrow on the top door will result in a 1/2-inch left margin.

Insert a sheet of paper or envelope in the slot between the paper guides.

Hold the paper so that the leading edge is making positive contact with the paper rollers.



Press the paper down hard.

FF / Load



Press the FF / Load key to load the form.

Manual Path Auto-loads the Next Sheet

With the manual paper selected, the printer will automatically do a paper load after a form feed. During a paper load, the paper feed system slowly advances paper to the top print position. The maximum distance paper will load is seven inches.

While the paper system is advancing following a form feed, slide a new form into the manual path. The paper will be loaded to the correct position.

If a new form is not loaded before the paper feed system advances its maximum seven inches, just press FF/ Load.

To use this feature, the application must send a form feed after every page or envelope.

Single Envelopes

Envelopes may be printed one at a time using the manual paper path. There are some constraints regarding printing single envelopes. They are:

- 24-lb maximum envelope stock.
- No windows.
- Beware of wide overfolds.
- Beware of large or embossed logos.

The very top of the envelope can not be printed on reliably. A top margin as little as one inch may be enough. This is one of the few instances when setting a top margin from the control panel is recommended.

If automatic head gap adjustment is used, the printer will sense the thickness of the envelope at the top edge and printing may smudge on the overfolds. If this happens, it may be necessary to use semiautomatic print head gap adjust. Expect to use several envelopes to find the combination of paper tension and print head gap that provides optimum print quality. Start with a paper tension setting of 3.

Continuous Envelopes

Continuous envelopes that are packaged on sprocket-feed strips should be fed from the BOTTOM paper path.

Any continuous envelopes designed for impact-matrix printing should work well in this printer, but test an envelope design before committing to it. The overfolds of envelopes can be a problem. The print gap must be set so the thickest part of the envelope doesn't get smudged; this is more print gap than is needed for optimum print quality.

For problem envelopes, experiment with the multipart setting to reduce carriage speed and increase print impact. This is in the Special Modes LCD submenu. On the printed menu, go through the Format menu to the Select Printing Mode submenu.

Clean Up After Nonbonded Paper

If the paper has a high lint or dust content, paper dust may combine with the ink on the ribbon to form a paste. This paste may accumulate in the ribbon cartridge and on the ribbon guide. It may also build up on the face of the print head and restrict the movement of the print wires. The following symptoms appear after a short operating period:

- fuzzy characters
- intermittent gaps or missing dots
- light printing occurring before the expected end-of-life of the ribbon

Correct this as follows:

Turn the printer off.

Remove the ribbon cartridge.

Clean the ribbon guide.

Use a foam swab dipped in rubbing alcohol to wipe away accumulated paste. *Don't* use rubbing alcohol with additives like witch hazel or wintergreen.

Clean the face of the print head.

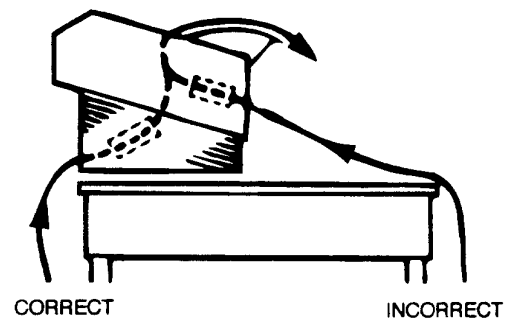
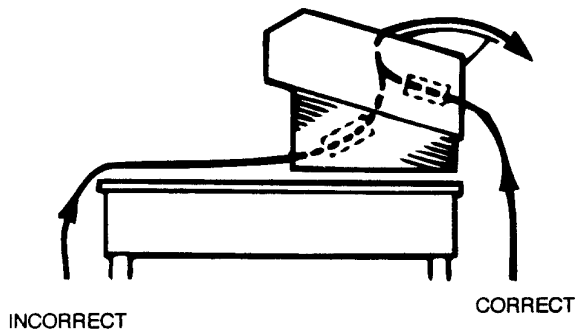
Gently wipe away accumulated paste using a foam swab dipped in rubbing alcohol. Loosen the print head mounting screws to tip the print head up so it's more accessible, but don't unplug the connector.

Secure the print head.

Replace the ribbon.

Tips for Continuous Forms

- When using a table or desk for the printer, position the printer and paper supply so that the paper does not drag on the edge of the surface as it enters the printer. The printer should be as close to the edge of the table or desk as possible.



- Place the paper box so that paper flows out of it without dragging on the sides of the box.
- Each time a new box of paper is started, bend the flaps down and tape them to the sides of the box or cut them off. Also pull the sides of the box away from the paper stack to allow clearance.
- As the paper supply begins to run low, remove the remaining paper stack from the box and place it beneath the printer.
- If printing bar codes, stiff forms, or thick multipart forms, place the paper supply beneath the printer and use the bottom paper path.

- When printing graphics or bar codes, don't use tear-off to view the page. Paper moves backwards during a tear-off cycle, and sometimes this causes a tiny error in vertical registration. The error is not noticeable when printing text, but an error as small as 1/72 inch shows up as a horizontal stripe in graphics or bar codes.

CAUTION

When printing continuous forms, don't attempt to back the perforation past the print head. This may cause the paper to snag on the print head. This is likely to occur when using tear-off to view a form.

Chapter 11. Maintenance and Troubleshooting

This printer requires very little regular maintenance other than replacing ribbons. The print head should last about seven hundred million draft characters and is easy to replace. Beyond this, adjust the print wire flight time compensation to recover print quality lost through print head or carriage mechanism wear.

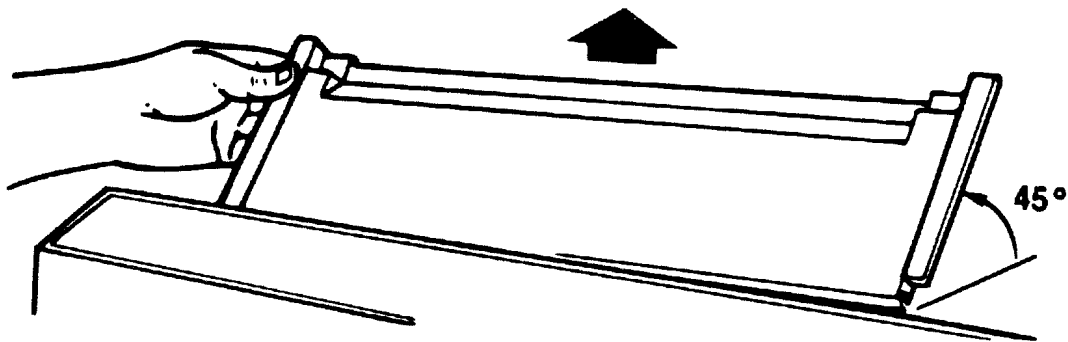
Clean the Printer

Technicians in our life-test lab clean these printers about once every 500 hours of operation. How often the printer is cleaned depends on the environment and on the dust and lint content of the paper.

WARNING

Turn off the power switch and unplug the printer from the wall outlet before cleaning the printer. If the printer has been printing, avoid touching the print head before it cools down.

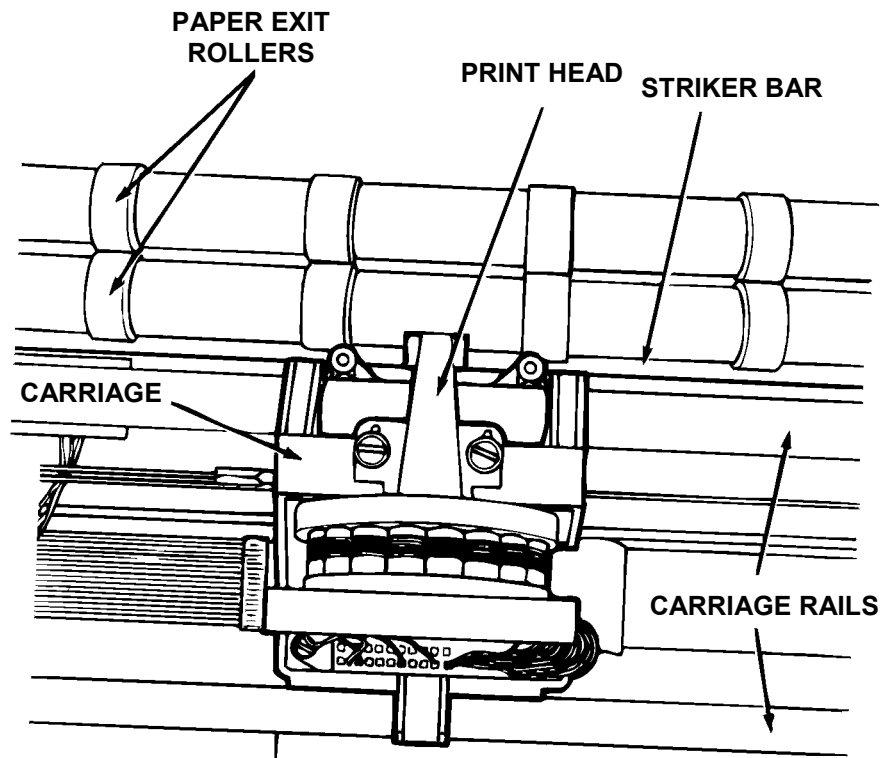
- Remove the top door by raising it approximately one quarter of the way and then lifting it from the printer.



Remove the Top Door

- Open the print gap
- Remove the ribbon cartridge.

- Use a soft brush or a vacuum cleaner to remove paper dust from inside the printer, especially around the print head, carriage, striker bar, and exit rollers.
- Wipe the carriage rails with a clean dry cloth to remove paper dust. Be careful not to leave fingerprints on the rails. Never lubricate the carriage rails.
- Reinstall the ribbon cartridge, adjust the print gap, replace the top door.



Cleaning Areas Inside the Printer

Clean the outside of the printer with a damp cloth and mild soap cleaner. Don't allow liquid to enter the air vents on the top of the left side cover. Don't use solvents or strong cleaners; these can discolor surfaces or remove lettering from the printer. Use a cream-type commercial hand cleaner such as Go-Jo® or GOOP® to remove stubborn ink stains. For best results, leave the hand cleaner on stained areas for one or two hours, and then wipe the treated areas with a clean absorbent cloth.

Troubleshooting

Problem

Cause and Possible Solutions

No control panel lights turned on.

The power cord is not plugged into the wall outlet. The outlet may not work. Check the outlet with a known good appliance. Check cable with a known good appliance.

Printer will not print. The Fault indicator is on.

Printer is out of paper. Reload paper and press the Clear key if Fault light remains on.

Top door not closed. Close the top door.

Remote paper park failure. See “Recover from a Remote Path Change Failure” in Chapter 10.

Printer will not print.

Make sure printer is online. Paper jam. Clear jam, reload paper, and press Clear key if Fault light remains on. Host driver hung; restart host print job; host machine reboot.

One or more 1-second beeps on power-up. Fault indicator flashes in unison with the beeps.

Internal circuit problem. Record the number of beeps, turn printer off, and call for service.

LCD says Factory Tests

Turn power off and turn off interface DIP switches 7 and 8 on the back of the printer. See “Interface Option Switches”, Chapter 12.

Incorrect (garbled) printing when using the serial interface.

Baud rate mismatched with data source. Select the correct baud rate. Incorrect character bit definition set. Incorrect interface control settings.

*Portions of characters
not printing.*

Print head too far from paper. Readjust print gap.

Ribbon guide not placed properly on print head nozzle. Reposition ribbon guide.

Twist in ribbon at the ribbon guide. Remove the ribbon and clear the twist.

Print head cable loose or installed one pin position to the right or left. Reconnect print head cable.

Paste buildup on face of print head resulting from non-bonded paper. See “Clean up After Non-bonded Paper”, Chapter 10.

Print head defective. Replace print head.

*Light printing or no
printing.*

Print head too far from paper. Readjust print gap.

Ribbon worn. Install a new ribbon cartridge.

Print head defective. Replace print head.

*Paper does not feed
properly.*

Paper not loaded correctly. Reload paper as shown in “Put Paper in the Tractors”, Chapter 2.

Print head too close to paper. Readjust print gap.

Paper supply not correctly aligned with paper opening. Reposition paper.

Ribbon guide not placed properly on print head nozzle. Reposition ribbon guide.

Paper jammed.

Paper damaged on leading edge or not in tractor pins. Remove paper from printer, tear off the damaged part, and reinstall according to “Put Paper in the Tractors”, Chapter 2. Be sure to remove all damaged paper from the printer.

Ribbon tears

Print Head defective; gap too small or too large; ribbon end of life.

Printer will not print to right end of page.

Right margin set too tight. This often happens when switching to compressed print; all of the emulations except ANSI set margins in columns. When trying to print a spreadsheet at 17 cpi, for instance, then go into the application and set the margin to 17 times the width of the page in inches.

Printed menus are unreadable due to very short print lines.

Margins set too tight in the current format. Press the First, 1, Enter, 1, Enter, Clear keys to get out of the printed menu. Note the format assigned to the current paper path and temporarily use a format with wider margins.

When attempting to go offline, the display switches to "ONLINE:ENTER CODE" and the MODE and ONLINE lights flash continuously.

Online lock has been entered from the host. Enter the correct code or, as a last resort, initialize the printer. See "Lock the Printer Online", Chapter 5.

When attempting to enter the printed menu, the display switches to "Prog:ENTR CODE."

Menu lockout has been set. Enter the correct code, or as a last resort, initialize the printer. See "Lock the Printed Menu", Chapter 5.

Hex Dump

Sometimes when the printer is not printing what is expected, it is because the host is not sending the right control sequences. The hex dump feature shows every byte of data that is sent from the host. See the chapter in the *Programmer's Manual* that applies to the emulation used in order to interpret the hex dump printout.

Choose between two presentations of hex dump: standard and enhanced. Each lists on the first line of the printout the status of certain signals on the currently selected hardware interface. The standard presentation shows every byte of received data in hexadecimal; this is similar to dumping a file using DOS DEBUG. The enhanced hex dump prints mnemonics in place of control codes such as escape, carriage return, line feed, form feed, and so forth.

On the printed menu, find hex dump in Test Options, which is under Interface Parameters. On the LCD menu, hex dump is under Utility.

To dump the last line, push the ON LINE key twice. Reset hex dump by cycling power to the printer.

For example, the printer is using one of the IBM emulations and receives the string “Mary had a little lamb” where the word “little” is in boldface.

Mary had a **little** lamb.

The enhanced hex dump of the string above would look like the following:

```
BUSY  HI  FAULT-  LI    PE    HI    SLCT HA  SLCT IN-  A
M   a    r    y    SP    h    a    d    SP    a    SP    ESC  E    l    i    t
t   l    e    SP    ESC  F    l    a    m    b    .    CR   LF
BUSY  HI  FAULT-  LI    PE    HI    SLCT HA  SLCT IN-  A
```

Checking the IBM chapter in the *Programmer's Manual*, note that ESC E turns on boldface, and ESC F turns it off again.

Serial Interface Loopback Test

When using serial interface, a loopback test can be run, for 80-column or 136-column as appropriate, from the Test Options menu. (Test Options is under Interface Parameters on the printed menu.) To run this test, a loopback plug (a device that allows the printer to send data to itself) must be installed in the serial interface connector with the following pins connected: 2-3, 4-5, and 6-20. See the *Service Manual*, for more details. Correct printing of the test pattern in the loopback mode indicates that both the transmit and receive circuits in the printer are working correctly.

Replacing the Print Head

Sometimes it is obvious that a new print head is needed, such as when a print wire is sticking out of the nozzle.

If the printout is consistently missing one dot, the problem could be the print head, the print head cable, or a wire-driver circuit. The easiest way to determine which is the problem is to replace the print head. If replacing the print head does not fix the problem, try replacing the print head cable.

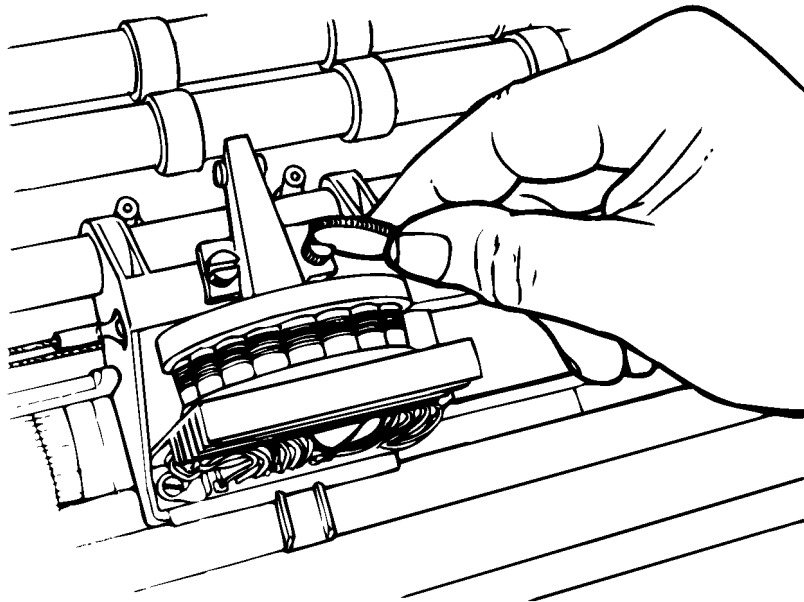
When experiencing gradually deteriorating print quality, however, try the following before replacing the print head:

- Make sure the print head mounting screws are tight.
- Perform the cleaning process described in “Clean Up After Non-bonded Paper”, Chapter 10.

- Put a fresh ribbon in the printer.
- Adjust the print gap offsets if necessary. See Chapter 7.
- Compare unidirectional print quality with bidirectional print quality. If unidirectional looks good, adjust the flight time compensation per instructions in this chapter.
- Clean print head (See page 11-8).

Remove the Print Head

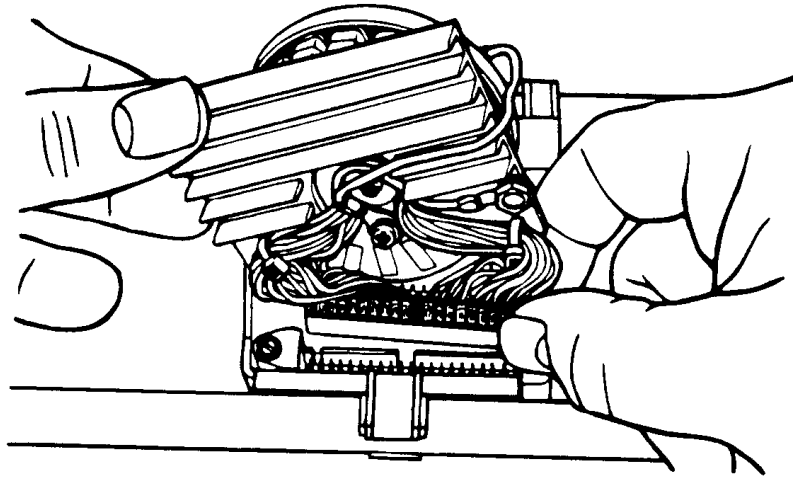
1. Press Park/Path to park the paper in the current paper path.
2. Turn power off, and unplug the printer from the wall outlet.
3. Remove the top door.
4. Move the print head to the middle of the printer.
5. Remove the ribbon cartridge.
6. Remove the two print head screws. Use a coin, such as a quarter, to loosen the screws.



Loosening the Print Head Screws

7. Lift the print head off the carriage.

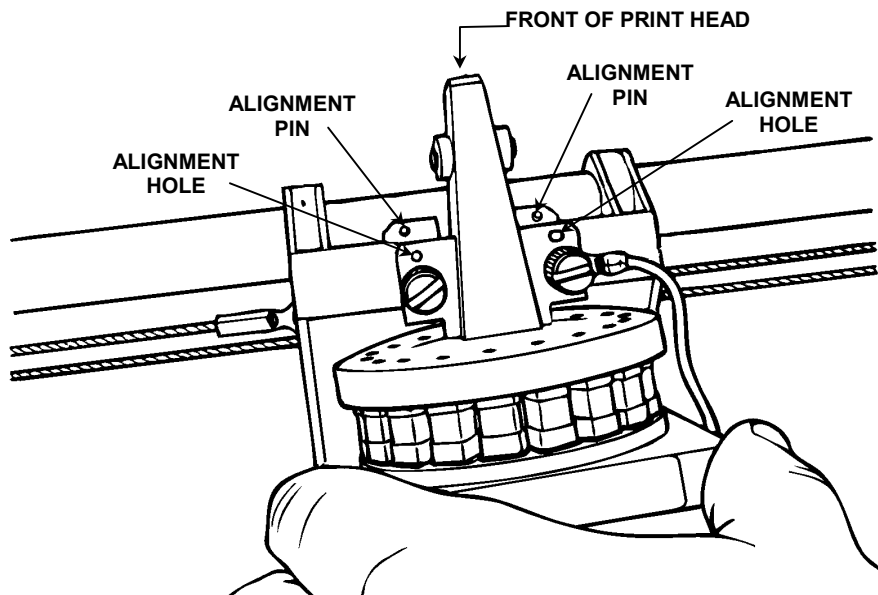
8. Remove the print head connector by pulling up on each side of it. Do not remove the print head cable or cable retainer from the carriage.



Removing the Print Head Connector

Cleaning the Print Head

Using a soft cloth or paper towel, gently rub the ink and ribbon and paper debris from the front of the print head. The front of the head has a white guide through which the print wires protrude. The white guide should be visible after cleaning the front of the print head.



Install the Print Head

1. Attach the print head connector to the connector in the carriage. Make sure it's firmly connected and that the wires are pressed down to avoid contact with the ribbon cartridge.
2. Place the print head on the carriage.
3. Insert the two small alignment pin on the top of the carriage into the two alignment holes on the bottom of the print head.
4. Make sure the black ground wire is under the right-hand screw.
5. Tighten the print head screws. Use a coin, such as a quarter, to tighten these screws.
6. Recheck the flight-time compensation; see next section.

Adjust the Flight-Time Compensation

Flight-time compensation affects the horizontal placement of dots during bidirectional printing. The traditional way to check it is to print full pages of nothing but uppercase "H" in bidirectional draft. If the vertical lines in the "H" wave back and forth from one line of characters to the next, the adjustment is off.

Another way to tell if flight-time compensation is off is to compare unidirectional letter-quality print with bidirectional letter-quality. If Unidirectional looks good but bidirectional looks like shadow printing, it's an indication that this parameter needs adjusting.

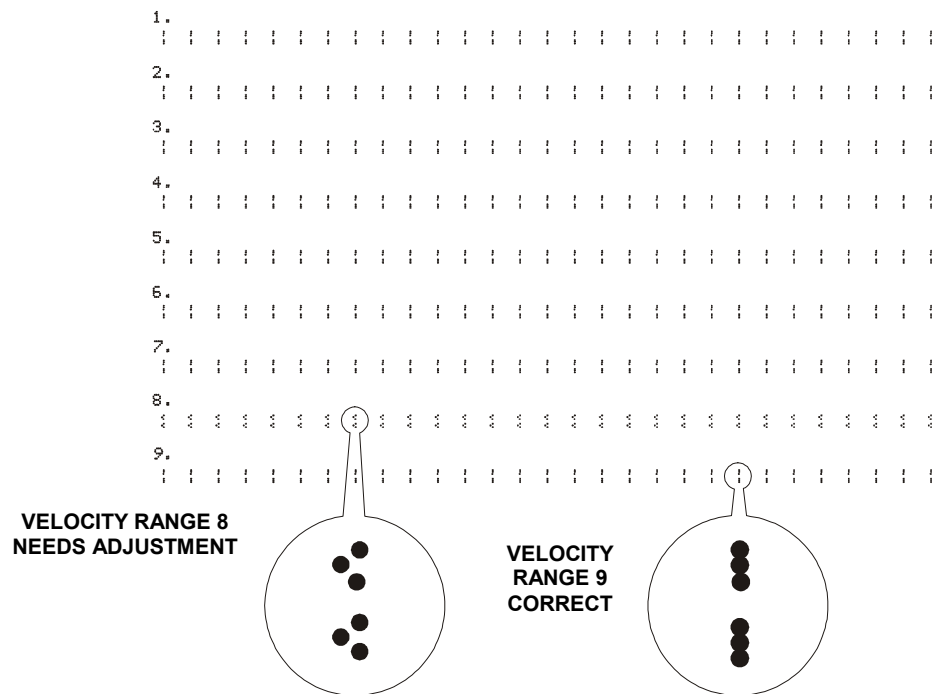
- The printer has seen a lot of service.
- The print head is replaced.
- A carriage-mechanism component, such as a drive cable, is replaced.
- A software upgrade is installed.

CAUTION

The flight time test patterns are long lines ! Be sure to use full-width (13.6-inch printing area) paper for this procedure.

1. Make sure the print head gap is set correctly to avoid adjustment errors.
2. With the printer offline, press the Enter key to enter the LCD menu, then select **Prog : PrMenu** to enter the program mode and get a main menu printout.

3. After the main menu prints out, press 9, 9, and Enter to enter the hardware configuration menu (the menu prints out).
4. Press 3 and Enter to enter the adjust flight time menu, which prints out as follows :
 1. Velocity Range 1
 2. Velocity Range 2
 3. Velocity Range 3
 4. Velocity Range 4
 5. Velocity Range 5
 6. Velocity Range 6
 7. Velocity Range 7
 8. Velocity Range 8
 9. Velocity Range 9
 10. Print All Current Flight Time Patterns
5. Press 1,0, and Enter to print all current flight time patterns.



6. The nine flight time patterns (rows of broken vertical lines) correspond to the nine velocity ranges used in the printer. If any of the broken vertical lines in a pattern are not straight (see enlarged samples above), adjust the flight time for that velocity range.

Press the numbered key for the velocity range needing adjustment and then press Enter. For example, to make the correct adjustment for the sample above, press 8 and then Enter.

Twelve flight time patterns print out as shown in the sample below.

[illegible]

7. The pattern represented by the flight time that is currently set in the printer for the selected velocity range is designated by the symbol “>”. Examine the twelve printed patterns in the printout and select the one with the straightest broken vertical lines. Press the numbered key corresponding to the selected pattern and then Enter. The selected flight time prints out.
8. Check the adjustment by reprinting the flight time patterns for the nine velocity ranges (see step 5). If others are out of adjustment, repeat steps 6 and 7 until all patterns for all nine velocity ranges are correct.
9. When finished making changes, exit through the main menu and save the changes.

Chapter 12. Interface

The printer is equipped with both a serial and a parallel interface as standard features. This chapter provides information about both of these interfaces.

RS-232C Serial Interface

All signal levels conform to EIA RS-232C / CCITT V.24. The interface is extensively configurable from the printed menu. (See Chapter 4.) The printed status report shows the current setting for the serial interface when it is active.

Serial parameters that can be controlled from the printed menu include:

- Baud rate
- Character bit definition
- Parity
- Ready-busy control using DC1 / DC3, CA, SCA, or CD
- Select-deselect using DC1 / DC3, CA, SCA, or CD
- Fault reporting using DC1 / DC3, CA, SCA, or CD
- CB (clear to send) or CC (data set ready) used to control transmission
- Lead polarity high or low for CD, CA, SCA, CB, and CC
- ETX (end of text) / ACK (acknowledge) protocol
- Receive buffer size – see Chapter 4.

Parameters

In order for devices to communicate via RS-232, the character frames (baud rate, number of data bits, parity, number of stop bits), as well as the handshaking, must be set the same at the transmitter and receiver.

The factory default settings for the character frame are 9600 baud, 1 start bit, eight data bits, one stop bit. The factory defaults for parity are ignore received parity and transmit even parity.

The computer expects to receive the READY/ BUSY status (handshaking) and fault status from the printer by receiving a special character (busy by code), or by reading the DC voltage on one or more of several signal wires (busy by level).

As shipped, the printer is set to indicate READY/ BUSY by code (XON/ XOFF) and also by level (DTR and SRTS). A fault condition is reflected in XON/XOFF and DTR.

DOS Machines

For those using personal computers, the default handshaking is compatible, and the default character frame matches the DOS defaults. Always set DOS **serial** parameters explicitly with the MODE command.

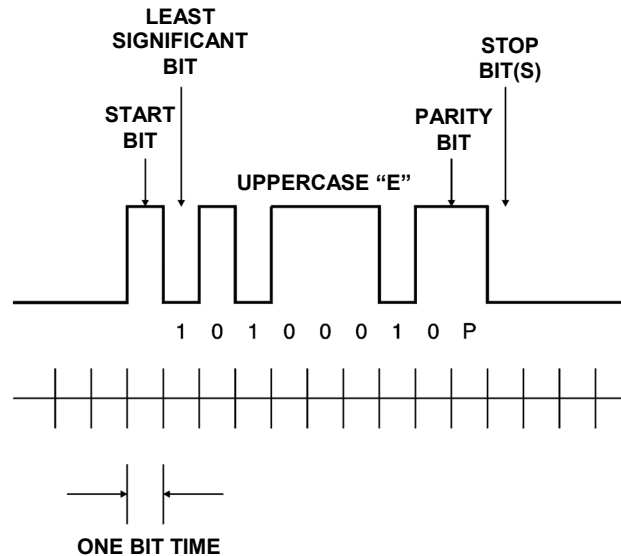
Seven or Eight Data Bits

A few years ago, a typical character-imaging device (CRT terminal or printer) would render about 94 symbols. This reflects the limits of the teletype machine, which is a conceptual descendent of the typewriter. It only takes seven bits of data to select among 128 symbols or control codes.

When seven-bit data is used, the eighth bit in the byte is often used as a parity bit. The parity bit might be set so that the number of ones in the byte is always even (even parity) or always odd (odd parity). This serves as an error check. The parity bit can also be set to always be zero (space) or always be one (mark).

As character-imaging devices have come to support more symbols, such as line-draw symbols and characters from non-English alphabets, a common method for transmitting these additional characters is to use the eighth bit for data.

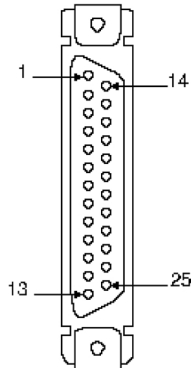
In RS-232, the least significant bit (LSB) is sent first, and the MSB is sent last. For characters 00 hex – 7F hex, the first seven bits are the same for 8-bit as for 7-bit communications.



Transmitted Parity

If the computer expects busy-by-code handshaking (XON / XOFF or ETX / ACK), the transmitted parity at the printer must match the host. Even with the printer set to IGNORE RECEIVED PARITY, the printer's parity must be set to match the host if using busy-by-code, otherwise the printer's buffer will fill up and lose data.

Serial Data Cable



The serial interface connector is a 25-pin female connector located on the back of the printer.

The serial interface data cable requires the following or equivalent parts to mate with the female connector on the printer.

Cannon 25-pin plug DBM-25P

Cannon shell DB115339-22

Screws #4 – 40 x 1/8 (2 required)

Serial Pin Assignments

A +5 volt supply is brought out on pins 22, 23, and 24. The maximum current available from these three pins combined is 1.5 amps.

Pin	Name	Circuit Description
1	AA	Protective ground
2	BA	Transmitted data from the printer
3	BB	Received data from the data source
4	CA	Request to send from the printer
5	CB	Clear to send from the data source
6	CC	Data set ready to receive data
7	AB	Signal ground
8		Not used
12,15,17	0V	+12V, -12V, +5V return
9	+12V	+12V volts, 250 milliamps (maximum)
10	-12V	-12 volts, 250 milliamps (maximum)
11,19	SCA	Secondary request to send
13	SCB	Secondary clear to send
14,16,18,21		Not used
20	CD	Data terminal ready
22,23,24	+5V	+5 volts, 500 milliamps (maximum)
*25	SCA	Secondary request to send

* Pin 25 is either connected to SCA in the printer or floats depending the status of switch 3 on the back of the printer. See “Interface Option Switches” in this chapter.

CENTRONICS Parallel Interface

With this interface, 7 – or 8-bit parallel data is accepted by the printer on a READY / BUSY closed loop basis at data transfer rates of up to 3.0 kilobytes per second. When the printer is online with a parallel data source, data is strobed into the printer one character at a time. A signal from the printer acknowledges receipt of each character.

Parallel interface configurations that may be selected from the menu are as follows:

- Busy indicated by busy lead and, optionally, by fault lead.
- Select / deselect (online / offline) indicated by the busy lead or the fault lead
- $\overline{\text{ACK}}$ pulsed during busy (not busy)
- $\overline{\text{ACK}}$ inhibited for offline to online transition
- $\overline{\text{ACK}}$ inhibited *on recovery* from paper-out condition.
- $\overline{\text{ACK}}$ inhibited *on recovery* from paper-out condition
- Lead polarity high or low for fault, select, paper out, $\overline{\text{ACK}}$, busy, and strobe
- Prime on received DEL (delete) code
- Select/deselect by received DC1 / DC3 codes

Parallel Interface Signals

$\overline{\text{DATA STROBE}}$: Input from the data source used to transfer data into the printer logic. Minimum pulse duration is 0.4 microseconds. You can set STROBE polarity from the printed menu.

$\overline{\text{DATA BITS 1-8}}$: Input character / control codes byte from the data source. High level represents a binary 1 and low level a 0. Data setup time is not necessary and the strobe pulse can be generated concurrently with data.

$\overline{\text{ACKNOWLEDGE}}$: A pulse that is generated by the printer to indicate receipt of a character. Menu options allow you to selectively enable or disable the pulse *on recovery* from any fault, paper-out, or deselect state; to set the pulse polarity; and to set the position of the pulse relative to busy.

BUSY: A signal generated by the printer to inhibit transmission from the data source. Menu options are provided to produce either a positive or negative signal, and to reflect fault, paper-out condition is true.

PAPER OUT: Output – high when a paper-out condition is true.

SELECT: Output – high when the printer is online.

PRIME: An input signal. If low for more than 50 microseconds, then the input buffer can be optionally cleared.

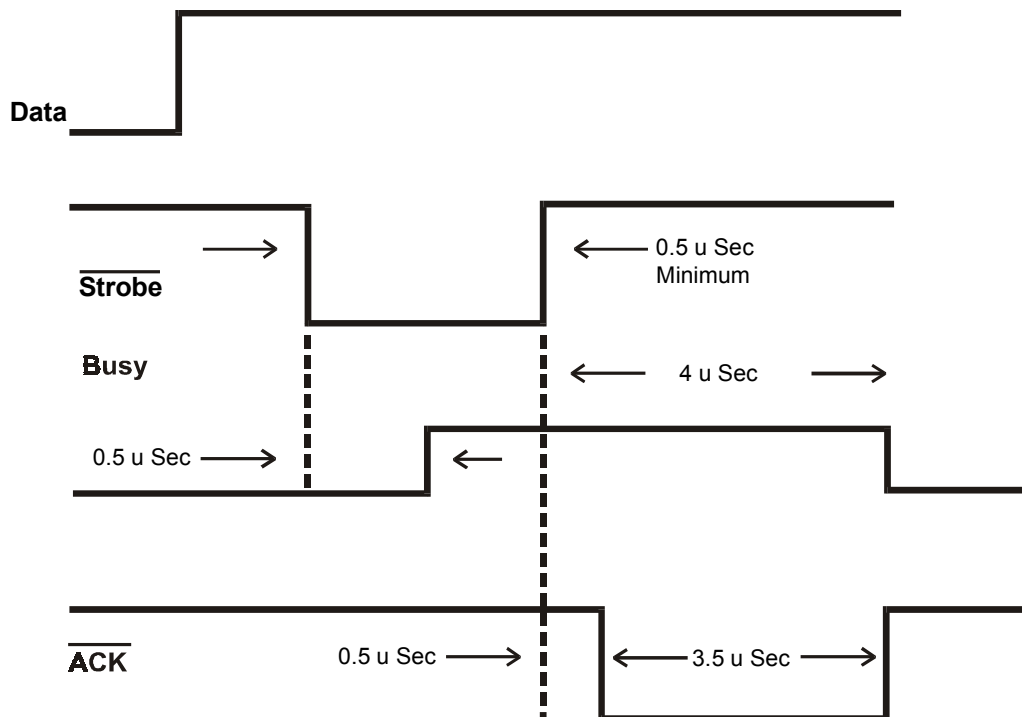
FAULT: An active low signal generated by the printer to indicate a printer fault condition.

AUTO LINE FEED XT: Input signal active low that causes an automatic LF on receipt of a CR. This signal is latched on the rising edge of a strobe.

SELECT IN: Input signal active low that enables the printer to accept data. Optionally, if high, the printer discards any received data.

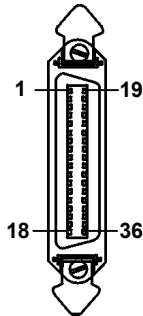
+5 VOLTS: This voltage is available on two interface pins for supplying power to external devices.

Parallel Timing Diagram



Max Data Exchange Rate : 200 K

Parallel Data Cable



This parallel interface data cable requires a 36-pin male connector (Amphenol part number 57-30360 or equivalent) to mate with the female connector on the back of the printer.

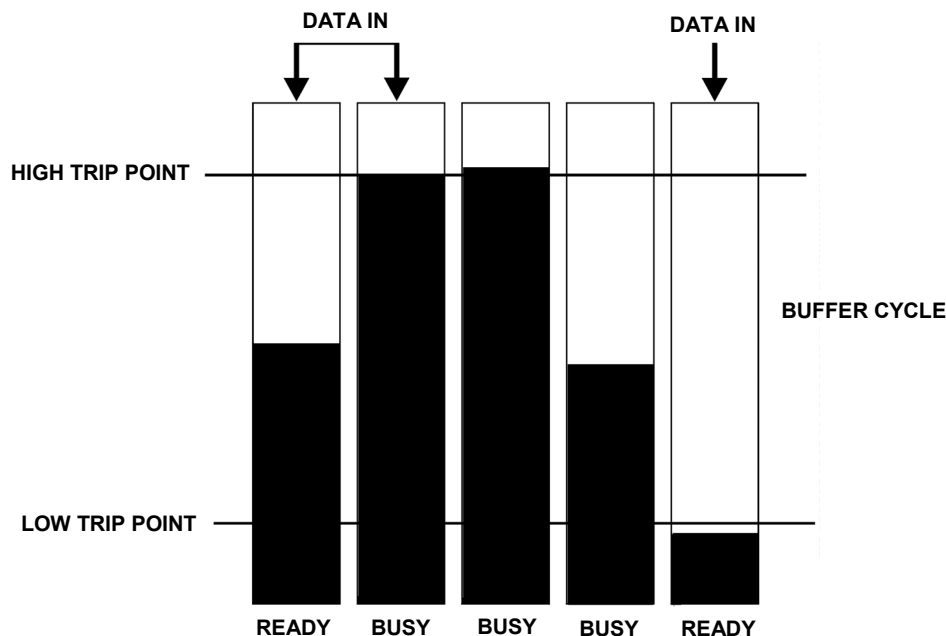
NOTE: Maximum output power for pins 18 and 35 combined is +5 volts, 1.5 amps.

Parallel Interface Pin Assignments		
Pin	Signal	Active Status
1	Strobe	Active high or low input
2	Data Bit 1	
3	Data Bit 2	
4	Data Bit 3	
5	Data Bit 4	
6	Data Bit 5	
7	Data Bit 6	
8	Data Bit 7	
9	Data Bit 8	
10	ACK	Active high or low output
11	Busy	Active high or low output
12	Paper out	Active high output
13	Select	Active high output
14	Auto LF XT	Not supported
15,30,33,34	Unused	
16,19-29		Signal ground (0V)
17	Frame ground	
18	+5V,750 mA (max.)	
31	Prime	Active low input
32	Fault	Active low output
35	+5V,750 mA (max.)	
36	Select In	Not supported

Buffer Options

At the time the printer is shipped, and again at initialization, the input data buffer size is 4K, the high trip point is 256 bytes below the top of the buffer, and the low trip point is 256 bytes above the bottom of the buffer. These buffer parameters can be changed from the Interface Parameters option on the printed menu, and the printed status sheet shows the current buffer settings. The buffer size can be set from 2K to 63K in 1K increments.

When the buffer fills to the high trip point, the printer sets a BUSY condition at the interface to tell the host to stop sending data. When the printer empties the buffer down to the low trip point, it sets a READY condition at the interface to tell the host to send more data.



The band between the high trip point and the top of the buffer applies to the serial interface only. The parallel interface will not honor a /STROBE pulse while BUSY is asserted. Therefore, when the parallel interface is used, whatever is set as the high trip point will be the top of the buffer.

The reason for the band between the high trip point and the top of the buffer is to allow receipt (and thus prevent loss) of data while the host reacts to BUSY. The default works in most cases, but, on some systems, there is significant delay between the time the printer goes BUSY and the data source responds to the message. The reason for the band between the bottom of the buffer and the low trip point is to give the printer something to do while the host reacts to the READY signal.

There can be as much as 4K of buffer capacity downstream of the input buffer. This downstream buffer capacity is not user-adjustable. Therefore, there is always more net buffer capacity than is indicated by the buffer menu.

Appendix A. Emulation and Software Options

The emulation and software options are straps that control less frequently adjusted aspects of the printer configuration. They are controlled from the printed menu. Unlike other menu items, the menu does not print a description of each option. This chapter tells what the options do and how to set them.

Emulation Options

The emulation options that can be set from the printed menu:

No.	Function	Emulation
*1	Compress characters on CPI changes to avoid overlapping print	ANSI
2	Reserved	
3	Enable 8-bit ANSI control functions (80 through 9F hex). Option 9 can be selected at the same time.	ANSI
*4	Respond to control codes while in the graphics mode	ANSI
*5	Reserved	
6	Reserved	
7	Select/deselect by received DC1/DC3 codes. (in parallel interface)	ANSI
8	Reserved	
9	Default character set (DIS = Set 1; ENB = set 2).	ANSI PPXL9
10	Answerback sent when ENQ is received.	ANSI LA210
11	Map italics to high-order characters in Epson.	FX286e
12	Abort control sequences containing control codes after the CSI	ANSI
13	Reserved	
14	Vertical tab (VT) ignored when no tabs are set.	ANSI
15	Enable cancel (CAN) code	PPXL9 IBMGP FX286e
16	Discard second and third arguments (p2 and p3) of escape sequences ESC[p1p2p3.	PPXL9
17	Default to 12-inch form on software reset	FX286e
*18	Initialization – DIS=normal Proprinter, ENB=initialized to power down state	PPXL9
19	Ignore the 8th bit in all ANSI emulations and in the DEC LA210 emulation	ANSI LA210
20	Allow Epson to print characters from 8-bit character sets	FX286e
21	Initialization – DIS=normal Epson, ENB=initialized to power down state	FX286e
22-32	Reserved	

* Selected when printer is shipped from factory

Setting Emulation Options

Emulation option settings can only be viewed from the printed menu. To change an emulation option:

1. With the printer offline, press the Enter key to enter the LCD menu. The LCD says **Prog : Exit**.
2. Press the UP ARROW once. The LCD says **Prog : PrMenu**.
3. Press the ENTER key to print the main menu.
4. Press 5 then ENTER to enter the emulation-dependent options menu.
5. Press 2 then ENTER to enter the user-selectable emulation options menu. Emulation dependent options settings are printed.

Select Emulation Dependent Options

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DIS	DIS	ENB	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	ENB	ENB	DIS	DIS	DIS
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Note: ENB = enabled; DIS = disabled.

6. To change an option, press the numbered key(s) of the option to be changed, then press Enter. For example, to change option 10, press 1, 0, Enter.
7. When all changes are made, exit through the main menu.

Software Options

The software options that can be set from the printed menu:

No.	Function
1	Back up to top of oversize characters.
2	Back up to top of bar codes.
*3	Print bar codes using a staggered dot pattern for better throughput and sharper resolution.
4	Print guard bars on applicable bar codes.
5	SI/SO control code toggles bar code and oversized.
6-8	Reserved
9 & 10	Base values for printed menu operation (not applicable to the LCD menu, which uses inches only).
*11	Reserved
*12	Bottom margin tracks form length.
*13	A paper out fault is automatically cleared when the paper is detected.
14	Load format assigned to current paper path on power-up.
15	Paper advances to the tear off position when the end of a form is reached.
16	Map Danish/Norwegian character substitutions (155 and 157 decimal) to all character sets.
17	Receive data in local state.
*18	Carriage speed reduced to 70% of normal for 12 dot high (line draw) characters and graphics.
19	Send a busy signal when offline after every 20 characters.
20	Strip leading and trailing white space from POSTNET bar codes. Also changes density to 24 bars/inch.
21	Unidirectional printing of postnet
22	Home the print head in auto view or tear off mode
23	Slow vertical slew for autoview
24	Enable paper cutter on form feed
25-36	Reserved

* Selected when printer is shipped from factory

Setting Software Options

To change a software option:

1. With the printer offline, press the Enter key to enter the LCD menu. The LCD says **Prog : Exit**.
2. Press the UP ARROW once. The LCD says **Prog : PrMenu**.
3. Press the Enter key to print the main menu.
4. Press 6 then Enter to enter the software options menu. Software options settings are printed.

Select Emulation Dependent Options

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DIS	DIS	ENB	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	ENB	ENB	DIS	DIS	DIS
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
DIS	ENB	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS	DIS

Note: ENB = enabled; DIS = disabled.

5. To change an option, press the numbered key(s) of the option to be changed, then press Enter. For example, to change option 10, press 1, 0, Enter.
6. When all changes are made, exit through the main menu.

Appendix B. Hardware Configuration Menu

The Hardware Configuration menu is a hidden submenu (item 99) on the main printed menu. Use it to:

Change hardware options

Adjust the print wire flight time

To change a hardware option:

1. With the printer offline, press the Enter key to enter the LCD menu. The LCD says **Prog : Exit**.
2. Press the UP ARROW once. The LCD says **Prog : PrMenu**.
3. Press the ENTER key to print the main menu.
4. Press 9, 9, and ENTER to print the hardware options menu.
5. Press 2 then ENTER to enter the hardware options menu.
6. To select or deselect an option, press the numbered key(s) for the number of the option to be changed and press menu.
7. When all changes are made, exit through the main menu.

Adjust the print wire flight time.

Directions for adjusting the flight-time compensation of the print wires are found in “Adjust the Flight-Time Compensation” in Chapter 11.

Appendix C. Options and Supplies

Ribbons

Ribbon Cartridge 3A1600B01

Interface Kit

RS-422.....3A0279B05

Paper Handling Options

Universal pedestal 3A1213B01

Paper catch tray (for universal pedestal) 3A1213B05

Forms rack (for universal pedestal).....3A1213B06

Paper output rack (for printer).....3A0113B01

Paper basket.....3A0120B01

Print Head

Print head, 18-wire, parallel 3D1322G04

Connectivity Options

GeniLink 510-IBM Coax Internal Power.....44A511894-0E1

GeniLink 520-IBM Twinax Internal Power.....44A511894-0D2

M202+ 10 BaseT Print Server 110V 98-215-100

M202+ 10 BaseT Print Server 990V 98-215-102

M202+ 10 BaseT/10 Base5 Print Server 110V 98-216-100

M202+ 10 BaseT/10 Base5 Print Server 220V 98-216-102

M202+ 10 BaseT/FL Fiber Link Print Server 110V 98-217-100

M202+ 10 BaseT/ FL Fiber Link Print Server 220V 98-217-102

M202+ 10 BaseT/10 Base2 Print Server 110V 98-218-100

M202+ 10 BaseT/10 Base2 Print Server 990V 98-218-102

M204 Base Unit 110V.....98-204-100

M204 Base Unit 220V.....98-204-103

Token Ring Card for M204.....99-455-000

Ethernet 10 Base 2 Card for M204.....99-455-001

Ethernet 10 BaseT Card for M204 99-455-002

M205 10 BaseT Print Server Internal Power 98-205-103

M206 10 Base2 Print Server Internal Power.....98-206-103

Packaging

Shipping container.....3C0921G05

Appendix D. Specifications

Performance

Maximum Printing Speed Models - 3870

- 900 cps data processing (12 CPI)
- 750 cps data processing (10 CPI)
- 240 cps letter quality (12 CPI)
- 200 cps letter quality (10 CPI)

Serial Data Buffer 63K selectable in 1K increments

Physical

Width: 26.9 in. (683mm)
Height: 12.1 in. (307 mm)
Depth: 13.9 in. (353 mm)
Weight: 52 lb (23.4 kg) Note: Printer is UPS shippable

Electrical

Voltage: 115 or 230 VAC $\pm$ 15%

Frequency: 50 or 60 Hz $\pm$ 2 Hz

Power Consumption:

Standby: 35 watts

Printing: 130 watts 1A.

Data Transmission

Code: US ASCII/ISO 7-or 8-bit

Interface: Dual RS-232C serial and CENTRONICS parallel

Speed (serial interface): 110, 300, 600, 1200, 2400, 4800, 9600 and 19200 baud

Speed (parallel interface): 30 Kbytes

Data connectors: 25-pin type DB female and 36-pin Amphenol

Paper Handling

Paper Paths: Rear, front/bottom, and manual. Any four of the stored user-defined formats, including page and print settings can be assigned to any of the three paper paths.

Zero Tear-off Feature: Adjustable for distance

Paper Loading and Parking: Automatic

Top of Form Setting: Automatic

Paper Drive: 6-pin push tractors in front/bottom and rear, friction feed top (manual) feed.

Paper Width:

Continuous forms 3 – 16 in.

Single cut sheets 3.5 – 17 in. wide X 5 – 17 in. long
with a minimum width to length ratio of 0.45 in.

Maximum Number of Copies: Original plus eight in front path, original plus five in rear path.

Maximum Forms Set Thickness: 0.025 in.

Paper Slew: 15 in./sec. default, 5 in./sec. user selectable

Paper Positioning: Horizontal any position; vertical within 1/72 in.

Printer Emulations

- ANSI X 3.64
- IBM GP
- IBM Proprinter XL III
- Epson FX286e
- DEC LA210
- Genicom 3410X

Print Technology

Type: Matrix impact

Print Head: 18-wire parallel (two 9-wire arrays)

Direction of Printing: Logic-seeking bi-directional or unidirectional (operator-selectable)

Print Modes: Proportional, compressed, shadow, double strike, underline, expanded, superscripts, and subscripts.

Character Sets: IBM Set I, II and All-Character sets plus 30 international character sets.

Head Slew: 75 in./sec. maximum LF Interval: 35 msec at 6 LPI

Character Spacing: 10, 12, 13.1, 15, 16.7, 17.1, 20 CPI plus program-selectable

Line Spacing: 3, 4, 6, 8 LPI plus n/144 in.

Print Line:

with no paper shear – 13.6 inches
paper shear – 12.7 inches

Print Styles:

Standard:

Gothic, Courier, Wide Gothic, Gothic Italic, Courier Italic, Micro Gothic, OCR-A, OCR-B, Oversize.

Barcode styles:

Interleaved 2 of 5, Bi-directional 2 of 5, Matrix 2 of 5, Industrial 2 of 5, Code 3 of 9, EAN-2, EAN-5, EAN-8, EAN-13, Code 11, Code BCD, Codabar a/t, Codabar b/n, Codabar c/*, Codabar d/e, UPC-A, UPC-E, UPC-2, UPC-5, Code 93, Code 128 (A-B-C), MSI, POSTNET

Dot Graphics Resolution:

Horizontal 60 to 400 dpi (protocol dependent)

Vertical 72 or 144 dpi (protocol dependent)

Ribbon Cartridge: Type of material is nylon; ribbon life is 15 million characters at data processing (draft) resolution.

Form Control

Margins:

Left and right: any position

Top and bottom: any position

Horizontal Tabs: 22, 28, or 32 absolute or relative (emulation dependent)

Vertical Tabs: 12, 16, or 64 absolute or relative (emulation dependent)

Maximum Form Length: 22 in.

Complete Index

>

> Arrow 4-1

A

Access the Printed Menu 4-2
Active Format 6-2
Adjust Top-of-Form 2-17
Auto Head Gap Adjust 7-2
Auto Load 10-11
auto switching interface 2-18

B

Bottom Feed 10-6
Buffer Options 12-8

C

CENTRONICS Parallel Interface 12-5
Change a Format - Printed Menu 6-3
Change Ribbon 7-2
Clean the Printer 11-1
Continuous Envelopes 10-15
Continuous Forms 10-16
control panel keys 3-1
Control Panel Lockouts 5-1
Currently Assigned Format 6-5

D

DOS Machines 12-2

E

Emulation Options A-1, A-2
Exit the Printed Menu 4-12

F

Flight-Time Compensation 11-9
Formats 6-1
Front Feed 10-6
Front Tractors 10-4

H

Hardware Configuration Menu B-1
Hex Dump 11-5

I

Install the Print Head 11-9
Install the Ribbon 2-5
Interface 12-1
ISU 9-1, 9-2

L

LCD Head Gap Menu 7-1
LCD menu 3-3
LCD Menu Map 3-5
LCD Message Display 6-5
Left Margin 8-5
Left Print Reference 8-3, 8-5
Line Registration on the first form 2-20
Linking Emulations to Formats 6-6
Load a Form 2-14
Load Length Adjustment 8-5
Local Margins 8-4
Lock the Printed Menu 5-3
Lock the Printer Online 5-1

M

Maintenance 11-1
Manual Paper Path 10-12
Manual Path 10-14
Margins for Menu Listings 4-3
Multipart Forms 10-11

N

Nonbonded Paper 10-15

O

Options and Supplies C-1

P

Paper Handling	10-1
Paper Out	10-11
Paper Path Change	6-3
Paper Paths	10-9, 10-10
Paper Tension	10-2
Parallel Data Cable	12-7
Parallel Interface Signals	12-5
Parallel Timing Diagram	12-6
Parameters	12-2
pedestal	2-1
power cord	2-1
Power Cords	2-3
power switch	2-4
Power Up	9-1
Power-up	9-1
Print a Test Pattern	2-15
Print All Format Information	6-2
Print Head	11-6
Print Head Gap Adjustment	2-17
print nozzle	2-10
Print Reference	8-2
printed menu	3-3
Printed Menu	4-1
Printed Menu Map	4-3
Printer Specifications	D-1
printer stand	2-1
Put Paper in the Tractors	2-11

R

Rear Tractors	10-7
Remote Path Change Failure	10-10
Remove the Print Head	11-7
Removing the Ribbon	2-10
Rename a Format	6-5
Replacing the Print Head	11-6
Reset	9-1
ribbon advance knob	2-9
ribbon cartridge	2-1
ribbon drive spindle	2-8
ribbon guide	2-10

rolling-ASCII pattern	2-15
RS-232C Serial Interface	12-1

S

Save a Format from the Control Panel	6-4
Save a Format from the Host	6-4
Saving to a Format	7-4
Select a Format from the Control Panel	6-4
Select a Format from the Host	6-4
Select the Assigned Format from the Host	6-5
Select the Emulation	3-7
Semiautomatic Head Gap Adjust	7-5
Serial Data Cable	12-4
Serial Interface Loopback Test	11-6
Serial Pin Assignments	12-4
serial printer cables	2-18
Setting Emulation Options	A-3
Setting Software Options	A-5
Setting to a Format	7-4
Seven or Eight Data Bits	12-2
Software Options	1, 4
Software Upgrade	9-2
Status Sheet	3-9
Stored Formats	6-2

T

Tear Off Distance	8-3
Top Margin	8-4
Top Print Reference	8-2, 8-4
tractor assembly	2-1
tractors	2-11
Transmitted Parity	12-3
Troubleshooting	11-1, 11-3

V

Various Keys	5-3
Vertical Paper Movement	8-1
Voltage Selector Switch	2-2